



BENCHMARKS

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On the Road to the Information Superhighway

By Claudia Lynch, *Benchmarks* Editor (AS04@unt.vml)

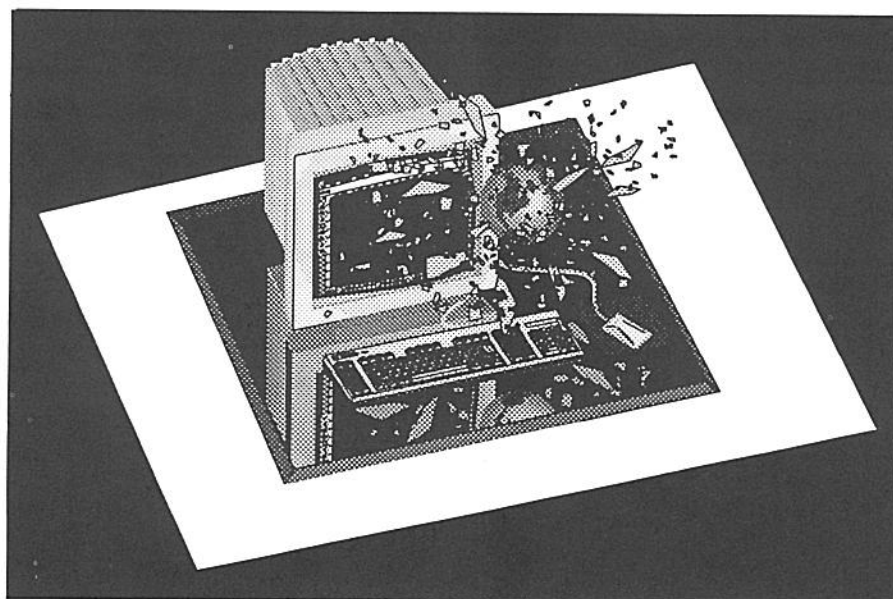
You've heard the term, you've groaned at the puns, but what exactly is the "Information Superhighway"? Good question.

For all intents and purposes, at this point in time, the Information Superhighway and the Internet are synonymous. The "Information Superhighway" is a marketing term that was coined to promote the "High Performance Computing Act of 1990," authored by then-Senator Al Gore.

Using the highway analogy, you might think of the Internet as I-35, and various other computer networks and services as access roads and feeder highways. As the popular weekend newspaper insert *USA Weekend* ([usaweekend@aol.com] January 21-23, 1994, p. 4) put it:

Please see **Highway** on page 3.

THE CHANGING INTERNET



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Area code 214 must dial 817 before the METRO #, see note to the right.

Note: Dialing 1 before the area code will result in a long-distance charge. Set Data Bits to 8, No Parity, Stop Bits to 1 except on the 3300 line when CALLing VM3270, where Data Bits are set to 7, Parity to S, and Stop Bits to 1. When dialing in, the autobaud feature requires you to hit the <RETURN>-key repeatedly after the connection is made so that the receiving modem can determine the baud rate. When you see the menu (or the UNTMODEMS> or # prompt) you can do the following to connect with the system of your choice.

ACS Host Systems	Local Phone Lines		METRO LINES (UNTMODEMS> prompt)	INTERNET (CUTCP, NCSA)
	565-3989	565-3300 (# prompt) Type SHOW D for list of hosts.		
Academic Mainframe (CMS, Academic COM-LETE)	Choose a host from the menu. If the host system isn't in the menu, type: telnet host.system. name.here (substituting the correct system information).	type: CALL VM3270	type: CONNECT VM3270 or VM3271, VM3272, VM3273	tn3270 vm.acs.unt.edu -OR- telnet vm3270.acs.unt.edu
VAX (VMS)		type: CALL DEC	type: CONNECT DEC	telnet vaxb.acs.unt.edu
Sol (UNIX)		type: CALL SOL	type: CONNECT SOL	telnet sol.acs.unt.edu
Jove (UNIX)		type: CALL JOVE	type: CONNECT JOVE	telnet jove.acs.unt.edu
Gopher [dedicated Gopher Server]		type: CALL GOPHER	type: CONNECT GOPHER	telnet gopher.unt.edu
Departmental Systems				
Ponder (Computer Sciences Sequent)		type: CALL PONDER	type: CONNECT PONDER	telnet ponder.csci.unt.edu
UNT Libraries' on-line card catalog		type: CALL LIBRARY	type: CONNECT LIBRARY	telnet library.unt.edu

To exit from the local phone lines, press <ESCAPE><RETURN>, type DONE (at the # prompt), press <RETURN><RETURN>. To exit from the metro lines, press <CTRL-SHIFT-6>, type DISCONNECT (at the UNTMODEMS> prompt), press <RETURN>. Exiting from telnet or TN3270 is dependent upon the package. CUTCP uses <ALT-X>.

HOURS FOR UNIVERSITY OF NORTH TEXAS COMPUTER ACCESS AREAS : Summer 1994

Day of Week	Willis	BA	ISB 110	Chilton 255	Chilton 116	GAB 330, Wooten	Matthews	Music	GAB 550, Terrill	ISB 205C	ISB I/O Area (138A)	Lab Locations
Monday- Thursday	Open 24 hrs.	8 am- MN	7:30 am- 10 pm	8 am- 10 pm	10 am- 10 pm	8 am- MN	8 am - 6 pm	8 am- 10 pm	8 am- 8 pm	10 am - 8 pm	Open 24 hrs.	☉ BA: 334, 335 ☉ Chilton: 255, 116 [Adaptive Lab] ☉ GAB: 330, 550 ☉ ISB: 110, 205C — graduate students only ☉ Matthews: 309 ☉ Music: 1007 ☉ Terrill: 220 ☉ Willis: 134 ☉ Wooten: 120
Friday	Open 24 hrs.	8 am-8 pm	7:30 am- 9 pm	8 am- 3 pm	10 am- 3 pm	8 am- 3 pm	8 am - 5 pm	8 am- 3 pm	8 am- 3 pm	10 am - 5 pm	Open 24 hrs.	
Saturday	Open 24 hrs.	8 am- 8 pm	9 am - 9 pm	10 am- 5 pm	Closed	Closed	10 am- 5 pm	Closed	Closed	10 am - 5 pm	Open 24 hrs.	
Sunday	Open 24 hrs.	Noon- MN	1pm - 10 pm	Closed	1-10 pm	2pm- MN	1-10 pm	1 - 8 pm	Closed	1-8 pm	Noon- MN	

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Highway continued from page 1.

On the information road map, such commercial online companies as Prodigy, CompuServe and America Online are analogous to private toll roads, offering users a preset array of information services for a monthly fee. Some on-line services offer "on ramps" to the Internet, an immense world-wide web of computer networks that is more like an interstate highway with exits to international destinations.

Metamorphosis

When *USA Weekend* does a story on something, you know it has arrived in the mainstream. When things become "mainstream" they usually metamorphose — for better and/or worse — from what they were before they were "discovered." This is especially true of the Internet.

The scholars and researchers who once considered the Internet their personal domain have been joined by bikers and businessmen, kindergartners and nursing home residents. This has caused some cultural clashes that have been interesting, upsetting, amusing, and enlightening, sometimes all at once.

What is the Internet changing into?

The Internet is becoming whatever it will be like when there really is an Information Superhighway.

What will it be like?

Laws passed and technologies invented and embraced today will determine what the Information Superhighway will be like in the future. It's all up to us.

Indications of the Future

The article on the right offers some indications of the way things seem to be heading — technologically, politically, and socially. Perhaps this will shed some light on what the future holds for the travelers on the Information Superhighway. ■

What Does the Future Hold for the Internet?

By Claudia Lynch, *Benchmarks* Editor (AS04@unt.vml)

No one knows what the future holds, but sometimes you can make an educated guess. By taking a sample of items reported in *EduPage* (edupage@ivory.edu.com.edu), "a twice-weekly summary of news items on information technology," between February and July of 1994 we can get an idea of the way things are going. Below are the results of this non-scientific sampling, arranged in broad categories. Some of the entries are not related to the Internet, *per se*, but give an indication of technological changes that may affect the way the Internet is used in years to come.

I'll leave it to you to draw your own conclusions. Let me know if you have any predictions you want to share with our readers.

Growth, Access and Distribution Methods

- **Internet Statistics: The Net Keeps Growing and Growing** — Traffic on the NSF backbone growing by a stunning 20.7 percent — nearly 2 terabytes — during the month of March — the largest single jump in the history of the Internet. Gopher traffic grew by 17.6 percent and http (WWW) grew by 32.0 percent to a new total of one-half terabyte per month. Http traffic grew by a total of 0.7 percent of total NSFNet traffic. (Internet Society, reported in *EduPage* 4/28/94)
- **Burgeoning Bulletin Boards** — According to *Boardwatch*, a magazine that follows BBS issues, the number of electronic bulletin boards has doubled in the past 18 months to 60,000 nationwide. More than 12 million Americans call into a BBS every day. (*Investor's Business Daily* 2/17/94 p. 4, reported in *EduPage* 2/17/94)
- **Population Boom in Cyberspace** — By the end of this year, nearly four million U.S. households will have signed on with one of the Big Three online services — America Online, CompuServe or Prodigy. (*Investor's Business Daily* 6/9/94 C17, reported in *EduPage* 6/9/94)
- **FCC Divides Up Airwaves** — The FCC today will begin the process of carving a niche in the spectrum for personal communications services. Citing industry estimates, Chairman Reed Hundt predicts in a decade approximately 100 million Americans will be paying about \$40 a month for PCs and other wireless services, as opposed to the \$60-65 that 17 million now pay for cellular service. The most controversial issue involved in the PCs auctioning process is whether there should be a set-aside for small businesses and minorities. (*New York Times* 6/9/94 C1, reported in *EduPage* 6/9/94)
- **NTIA Will Fund Information Highway** — The head of the National Telecommunications and Information Administration says its budget will go primarily toward jump-starting the creation of an information highway. \$100 million of a \$134 million budget request will go to grant programs to "help state and local governments, schools, libraries, and health care and public safety providers to undertake the planning needed to ensure effective development of the telecommunications infrastructure." (*BNA Daily Report for Executives* 4/15/94 A32, reported in *EduPage* 4/19/94)
- **Small Change on the Net** — Researchers at Carnegie Mellon University are developing NetBill, a computerized system for tracking and billing users for small

transactions, such as a ten-cent charge per document. The developers hope NetBill will evolve into a universal accounting system on the Internet. (*Chronicle of Higher Education* 4/20/94 A31, reported in *Edupage* 4/19/94)

❑ **Smart Housing** — A consortium plans to link a community of 300 new "smart homes" and university residences in Newmarket to services ranging from home shopping to health care in a \$50-million field trial of multi-media technology set to be operational by August 1995. Members of the Intercom Ontario consortium include York University, University of Toronto, the Government of Ontario, IBM Canada and Apple Canada (*Toronto Star* 4/19/94 D1, reported in *Edupage* 4/19/94)

❑ **High-Speed Data to the Home** — AT&T launches a new high-speed data service designed for use in the home. The company's Digital Long Distance Service will allow customers to make local and long-distance calls, as well as send full-motion color video, fax and data files over a single telephone line. (*Tampa Tribune* 4/27/94 B&F8, reported in *Edupage* 4/28/94)

❑ **McCaw & Gates Plan Satellite Network** — Two high-tech entrepreneurs are planning a \$9 billion wireless "global Internet," using low earth orbit satellites to provide a wide array of wireless interactive voice, data and video services. Craig McCaw, McCaw Cellular Communications, and Bill Gates, Microsoft, envision a system that employs 840 refrigerator-sized satellites operating the 30/20 Ghz Ka-band to connect handheld phones and other electronic devices to telephone networks around the world. As currently planned, the Teledesic Corp. project is more than 10 times the size of Motorola's low earth orbit Iridium project. (*Wall Street*

Please see **Future** on page 9.

The Ghost in the Modem

For Architects of the Info-Highway, Some Lessons From the Concrete Interstate

By Richard Sclove (resclove@amherst.edu) and Jeffrey Scheuer

In keeping with the theme of this issue, we offer you the following article as food for thought. This article "is one in an occasional series of E-mail postings on democratic politics of science and technology, issued by The Loka Institute," and is reprinted with their permission. Section headers were added here by the editor.

This article was written by Loka Institute members, and is reprinted from the "Outlook Section" of The Washington Post, Sunday, May 29, 1994. Richard Sclove is executive director of the Loka Institute in Amherst, Mass., a public interest research organization concerned with science, technology and democracy. He also directs the Public Interest Technology Policy Project at the Institute for Policy Studies. Jeffrey Scheuer, a New York writer, is a fellow of the Loka Institute, P.O. Box 355, Amherst, MA 01004-0355

Vice President Gore envisions the information superhighway as the second coming of the interstate highway system championed by his father, former U.S. Senator Al Gore, a generation ago. Let us hope that the junior Gore is proven wrong. Rush-hour traffic jams, gridlock, garish plastic-and-neon strips, high fatality rates, air pollution, global warming, depletion of world oil reserves—have we forgotten all of the interstate highway system's most familiar consequences?

It's not that Gore's analogy is wrong, only that his enthusiasm is misplaced. Comparing the electronic and asphalt highways is useful—but mostly as a cautionary tale. Building the new information infrastructure will not entail the degree of immediate, physical disruption caused by the interstate highway system. But sweeping geographic relocations, and accompanying social transformations, seem probable. And the risk of inequity in contriving and distributing electronic services—or, conversely, imposing them where they are not wanted—is clear.

Social Repercussions

Indeed, disparities in access to new information systems have already begun to surface. A study released this past week by a group of public interest organizations, including the National Association for the Advancement of Colored People and the Center for Media Education, notes that low-income and minority communities are underrepresented in U.S. telephone companies' initial plans for installing advanced communications networks.

Unequal access is only the most obvious among many social repercussions that may lie in store for us. The real history of the interstate highway system suggests how we can think about and control the vast implications of new technologies and a new national public infrastructure.

It is widely assumed that Americans' infatuation with cars led to the construction of America's superhighways. But actually when Congress passed the Interstate Highway Act in 1956, car sales were slack, and there was no popular clamor for building a new road system. At the time only about half of American families owned an automobile; everyone else depended on public transportation. Congress was responding to aggressive lobbying by auto makers and road builders, plus realtors who saw profits in developing suburban subdivisions.

The Changing Internet

The Act's key provisions included support for bringing freeways directly into city centers and earmarking gasoline tax revenues for highway construction. As the interstate highways were built, city and suburban development adapted to the quickening proliferation of autos. Soon more Americans found themselves forced to buy a car in order to be able to shop or hold a job. The Highway Trust Fund, by assuring the rapid atrophy of competing public transit systems, bolstered this trend.

Thus the asphalt highways—and the society around them—are a reflection of successful lobbying by powerful business interests and external compulsion, not simply the free choices of consumers. There is no guarantee that the process of wiring consumers and employees into the electronic highway system will be different.

The effects of the interstate highway system on American communities were profound, especially in the cities. As historian James Flink notes, "Ambitious programs for building urban freeways resulted in the massive destruction of once viable poor and minority neighborhoods." In other cases, new highways encircled poor neighborhoods, physically segregating minorities into marginalized ghettos.

Gradually, a black and Hispanic middle-class did emerge. Its members too fled along the interstate to the suburbs, further draining economic and cultural resources from the inner city. This contributed to the emergence of a new social phenomenon: today's desperately deprived, urban underclass.

Elsewhere the effects were subtler but still significant. The noise and danger from growing numbers of autos drove children's games out of the street, and neighbors and families off their front porches. Before long, suburbs without sidewalks came to signal an unprecedented paucity of local destinations worth walking to. Suburban house-

Please see *Ghost* on page 14.

Another Way to Cruise the Internet

By Eriq Oliver Neale (neale@unt.edu) (<http://lipsmac.acs.unt.edu/>)

I like to think of myself as being "up to date" with the latest technologies and communications infrastructures. I have a high-end Macintosh on my desktop, I have an Ethernet connection to the internet world, I've got modem connections to other places in the world, I've got lots and lots of files occupying lots and lots of disk space, well, I think you get the idea. I've really been taking this whole "information superhighway" thing for granted, because I'm so well-connected here in my office. Admittedly, there are times that I forget that not everyone has the type of connectivity that I do. So, sometimes I get lax about investigating "new toys" that I come across. Well, this one came back to bite me.

About a year ago, I first heard about "the Web." The term didn't carry much significance for me, and I was fine with what I had access to, so I ignored it. But time and time again, I kept hearing the term used. I began to hear more and more people talk about it. So I finally decided to investigate for myself. What I found was a communications mechanism far beyond what I thought it could have been, not to mention one that can be rather confusing at first.

What it is

The Web is really just another way to access information on the Internet. There is not a separate communications network that is dedicated to the Web, instead the Web provides a different mechanism for accessing sites that are on the Net. If you're already familiar with Internet services such as Gopher and FTP, you already know about those parts of the Web.

Web versus Gopher

Let's take a moment and compare the Web to Gopherspace. Mark Thacker has written many articles about Gopher in previous issues of *Benchmarks* and other publications.¹ With Gopher, you run a client on your computer that connects to a Gopher server on another computer, and the information stored on the server is displayed to you through the client software. The Web operates identically: you run a client (usually called a Web browser) on your computer which connects to a Web server to display information.

So what is the difference between Gopher and the Web? Gopher is essentially a text-retrieval system. Sure, it can be used to download files of all types to a local disk, but it can only interactively display text items. These items are presented in a menu-like hierarchy for selection. Because of the textual nature of Gopher, there are clients for just about every type of computer imaginable, including a dumb terminal. No special graphics capabilities are needed to access the information contained within a Gopher system. Gopher systems can generally connect only to other Gopher servers. There are a few Gopher to WAIS and other gateways, but Gopher works best when talking to its own kind.

Web browsers are more visually-oriented. As such, the most prominent Web clients are heavily graphic, although there are a few character-based clients being used.

¹ "News from the CWIS/Gopher Hole," a column by Mark Thacker, is a regular feature of *Benchmarks*. This issue's column is found on page 22. Two recent articles by Mark that might be of particular interest to readers of *this* issue appeared in the May/June 1994 *Benchmarks* on pages 19 and 21.

The Changing Internet

Not only will a Web client display textual information, it will also display certain types of images inside the client, and some clients will handle some forms of audio directly as well. Information items are presented in a free-form hypertext metaphor instead of a structured list or menu (though a Web site could set its information up in this way). But possibly the most important functional difference between Web and Gopher clients is that Web clients can access many other systems directly, such as FTP and Gopher. So it is possible to use a Web client to access a Gopher site in very much the same way as a Gopher client would access the site.

Which system is better? That's a question that cannot be answered. There are pluses and minuses to both systems, but the system to use is the one that will afford you best access to the information you wish to retrieve.

What it Does

Without getting into too much technical detail, let's look into how information is delivered to a Web client. We'll begin by looking at how the information is prepared on a Web server and end with a brief overview of some of the Web clients that are currently available.

HTML and Web Pages

The metaphor used by Web clients and servers to disseminate information is that of a **page**. When your client connects to a server, a Web page is displayed. While each page may look completely different, each one is formatted to follow an exacting specification. This format is called HTML.

HTML is an acronym for HyperText Markup Language, and it is the language that each Web client speaks. When your client connects to a Web server, it downloads an HTML file. The codes in that file specify what the client is to display on the screen. The HTML file includes information about which GIF images should be displayed (if

any), the style and appearance of any text, and links to other Web information sites.

Without going into detail, let me illustrate how a page might be formatted. In this example, I'll borrow liberally from my own home page (see the address in my byline). I've created an HTML file which contains information about myself and where I work (and the kind of work I should be doing), a few images of myself and campus, and many links to other pages. Some of these links are to other local HTML files (such as my Texas Rangers Baseball Schedule or project list), and some are to pages that exist on other servers (such as the Dinosaur Exhibit at the University of Hawaii <http://www.hcc.hawaii.edu/dmos/dmos.l.html>, the Web guide to Nasa http://hypatia.gsfc.nasa.gov/NASA_homepage.html, and Dr. Fun <http://sunsite.unc.edu/Dave/drfun.html>). The person viewing my page doesn't have to know where all these resources are. He or she will simply click on the indicated link area of the page and be transported to the other site automatically. Really, it's not magic, but it sure seems like it sometimes.

Finding Sites with a Web Browser

How does the client software know where to get the information indicated in a link? And how does it know what type of information it is accessing? Each link contains a formatted address which indicates not only the type of link, but also specifically where that link exists. If you've been reading a number of mailing lists or newsgroups recently, you've probably seen something like this within a message or signature: <http://lipsmac.acs.unt.edu/Rangers/schedule.html>

This is a Web address that indicates the location of my Texas Rangers Web page. Let's break the address down and see what's really being said.

The **http:** tells the client to make a hypertext transfer protocol connection. Other types of connections would be **ftp:** and **gopher:**. The client will treat

each connection type differently because it's accessing a different set of services.

The [//lipsmac.acs.unt.edu](http://lipsmac.acs.unt.edu) tells the client the address of the computer where the server software is running. This is a standard Internet address that would be used in making an FTP connection or a Gopher connection.

The [/Rangers/schedule.html](http://lipsmac.acs.unt.edu/Rangers/schedule.html) tells the client which file on the server to display. With Web clients, the extension on a filename is important. **html** tells the client that the file is an HTML-formatted file. Other extensions have different meanings (.gif indicates a GIF file, .au indicates an audio file, etc.).

Most Web clients have options where the location of the page being viewed can be displayed on the screen along with the page. Some people like to see this information, others may get confused by it.

Let's see another example. Suppose my client found the link <ftp://ftp.unt.edu/pub/antivirus/mac/gatekeeper-127.hqx>. It would make an anonymous FTP connection to [ftp.unt.edu](ftp://ftp.unt.edu) and download the file named `gatekeeper-127.hqx` from the `/pub/antivirus/mac` directory. Makes sense now, right? Right. Me neither.

Multiple Server Sites

So is it possible for an Internet site to run more than one server simultaneously? Absolutely. At one point I had an FTP server, a Gopher server, and a Web server running on my Mac at the same time. I quit doing that for a number of reasons, most importantly being that I was running out of memory! But it is possible to see several different types of links to the same address. One might see a link <ftp://mimas.acs.unt.edu/> or <gopher://mimas.acs.unt.edu/> in a page. While these links go to the same machine, there may be reasons to access the information differently.

Web Clients

Being the Mac-head that I've become, I'm most familiar with the two Web

clients that I've used on that platform. They are NCSA Mosaic 2.00 and MacWeb 0.98. Both are built around the Mac GUI and function fairly well in that environment. There are still some problems with both clients, but they are very usable for Web browsing. On the PC, there is WinMosaic from NCSA for Windows, and Lynx for DOS. I'm only marginally familiar with WinMosaic, and I've only seen Lynx once. On the UNIX side of things, you have XMOsaic from NCSA and Lynx again. The article below lists some sources for these clients.

What it Means to You

I've found in the few weeks that I've been experimenting with Web software that it really is an easy access method to information out in the world. While the number of FTP and Gopher sites is still very large, the number of Web sites are increasing rapidly. Especially when you have people like me putting up their own pages for whatever ego strokes they may receive as a result. But as non-technoids begin to hook up to the superhighway, Web servers and clients are going to make it an easy transition for them. Plus, commercial services like America Online have plans to add Web functionality to their services. Soon, we'll all be travelling at light speed on this information web being weaved daily. ■

Location of Web Clients

- **MacWeb:** <ftp.cinet.net>
/inet/mac/macweb0.98alpha.sea.hqx
- **Cello:** <fatty.law.cornell.edu>
/pub/LII/Cello
- **Lynx:** <ftp2.cc.ukans.edu>
/pub/lynx
- **NCSA clients:** <ftp.ncsa.uiuc.edu>
/Mosaic/...
- **NCSA Clients (alt):** <sunsite.unc.edu>
/pub/packages/infosystems/WWW/clients/... ■

Best O' The Net

This article is taken from a GNN press release dated June 1, 1994. For more information and art work for GNN and the twelve winning services contact: Ron Pernick, Niehaus Ryan Haller Public Relations, Inc. (415) 615-7891 ron@nrh.com

Global Network Navigator (GNN), a leading Internet-based publisher and online service, recognized twelve of the best destinations on the Internet in an Editor's choice award at Internet World in San Jose, California, June 1, 1994. Recognized for their contribution to the Internet were services including The Paleontology Server, an interactive natural history museum; the Internet Underground Music Archive, a service which promotes obscure and unavailable bands; and the U.S. Census Information Server, the self-proclaimed "Factfinder for the Nation." Also presented by GNN's editors was the First Citizen of the Net award, which went to noted author and online visionary, Howard Rheingold, for his efforts in identifying the democratic role of online communities.

"The Best of the Net awards represent the diversity and character of the Internet," explains Dale Dougherty, GNN publisher. "These awards represent the coming of age of the Internet, and is our way of recognizing some of the most fascinating destinations on the info highway."

Below is a complete list of the information services awarded by GNN:

- **ArtServe** (<http://rubens.anu.edu.au/>) — Artserve is an arts history database consisting of 2,800 images of prints largely from the 15th century to the end of the 19th century. It was developed by Professor Michael Greenhalgh at Australian National University.
- **The Currency Converter** (<http://www.ora.com/cgi-bin/ora/currency>) — The currency converter, developed by David Koblas, automatically converts currency from one denomination to another. It is an excellent example of how information can be presented interactively.
- **EduPage Newsletter** (<http://www.ee.surrey.ac.uk/edupage/edupage/>) — The EduPage newsletter is published three times a week via E-mail, Gopher and the World Wide Web. It summarizes printed news coverage of interest to leaders and citizens of the Internet.
- **The Paleontology Server** (<http://ucmp1.berkeley.edu/welcome.html>) — The University of California Museum of Paleontology server is an interactive natural history museum that is well organized and makes use of large graphics. You can learn about phylogeny, the "Tree of Life," or examine photographs of Great White Sharks off the California coast.
- **International Teletimes** (http://www.wimsey.com/teletimes.root/teletimes_home_page.html) — According to its writer's guidelines, this general interest magazine "seeks to present informed opinion and observation drawn from the experience of living in a particular place." Editor-in-Chief Ian Wojtowicz is sixteen years old.
- **Internet Underground Music Archive** (<http://sunsite.unc.edu/ianc/>) — Developed by UC Santa Cruz students Robert Lord and Jeff Patterson, the Internet Underground Music Archive intends to apply the principles of free software to music distribution. Going beyond the limits of what's defined as commercially viable, the Archive seeks to promote obscure and unavailable bands.
- **Science Fiction Resource Guide** (ftp://gandalf.rutgers.edu/pub/sfl/sf-resource_guide.html) — This guide organizes access to science fiction-based books, movies, television, awards, trivia, conventions and more. With the help of this resource

you can discover the nominees and winners of the Hugo awards, explore Star Trek trivia and more.

- ❑ **New Zealand Information** (<http://www.cs.cmu.edu:8001/Web/People/mjw/NZ/MainPage.html>) — Located at Carnegie Mellon, this server provides access to a wealth of information about New Zealand including climate forecasts, speeches in the native Maori language and descriptions of the most ancient of all living reptiles, the Tutarā.
- ❑ **Taxing Times** (<http://www.scubed.com:8001/tax/tax.html>) — Presented as a public service by Maxwell Labs, Taxing Times is a repository of tax forms including many IRS publications online. On April 14 there were 10,300 document accesses from 1100+ hosts.
- ❑ **US Census Information Server** (<http://www.census.gov/>) — This self-proclaimed "Factfinder for the Nation," the Census Bureau's server organizes information such as financial data on state and local governments and schools, poverty in the U.S., and housing changes.
- ❑ **Hypertexted USENET FAQs** (<http://www.cis.ohio-state.edu/hypertext/faq/usenet/FAQ-list.html>) — Organized by Thomas Pine of Ohio State University, this server makes the answers to frequently asked questions (FAQs) about the Internet easy for online users to find.
- ❑ **Xerox PARC Map Viewer** (<http://pubweb.parc.xerox.com/map>) — MapViewer is a fully interactive application that dynamically renders a map based on user input. It allows people to access geographic and demographic information such as population, exact location and region name.

About GNN

Global Network Navigator provides direct links to more than 650 information servers on the Internet. Introduced in October 1993, its subscriber base has

Drop of BITNET Connection Likely

By Dr. Philip Baczewski, Assistant Director, Academic Computing Services, and BITNET INFOREP (ac12@unt.edu)

It appears likely that UNT will cease to be an active member of the BITNET network as of August 31, 1994. On April 17, 1994, Rice University stopped acting as a core BITNET node. Since Rice served as the sole connection point for the BITNET network in the state of Texas, this change caused many schools to reevaluate their BITNET membership. Most of the UT system left BITNET in April as well.

Through the courtesy of the University of Texas at Arlington, we have been able to continue BITNET services beyond the April date of Rice's departure as the primary connection point. Since most BITNET LISTSERV services are now available via Internet mail, and because BITNET's parent organization, CREN is slow to take steps to modernize the network, there are fewer and fewer reasons to maintain the membership.

If UNT ceases to be an active member of the BITNET network, only services which rely on interactive messages (sent via the CMS TELL command) will no longer be available. Most mailing list subscriptions will not be affected and LISTSERV services will still be accessible via a mail message. We have already taken steps to convert LISTSERV subscription addresses to the Internet format for the nodename for CMS (vm.acs.unt.edu) or the VAX (vaxb.acs.unt.edu).

Your Internet Address

It is important to now begin using your Internet address when exchanging addresses with colleagues around the country or world.

- Your Internet address on CMS is: userld@vm.acs.unt.edu
- Your Internet address on the VAX is: userld@vaxb.acs.unt.edu

Userld is your CMS or VAX User-ID. If you use either system for E-mail, you should supply people with the Internet form of your address. If you have any questions or comments about UNT's BITNET connection, please contact me (ISB 119, 565-2324). ■

expanded to over 30,000 registered users. In an average week, GNN is accessed 150,000 times. As part of its service, GNN offers up-to-date news, online forums, the industry's most complete Internet directory, online advertising, and topic-centric information centers.

Global Network Navigator is a free service, and is available to anyone with full connections to the global Internet system who has downloaded Mosaic software for Mac, Windows or UNIX Workstations.

GNN is a product of O'Reilly & Associates, Inc., a leading publisher of

books for UNIX, X, and the Internet, including the best-selling *The Whole Internet User's Guide and Catalog* by Ed Krol. O'Reilly & Associates, based in Sebastopol, CA and SPRY, Inc. of Seattle, WA will introduce Internet in a Box this summer — this shrink-wrapped package will make accessing GNN and the World Wide Web (WWW) easier for a whole new audience of users.

GNN's URL address is <http://gnn.com>. Those with E-mail can receive information and registration forms to GNN by sending E-mail to info@gnn.com. Information is also available by phone at 1-800-338-6887. ■

Future continued from page 4.

Journal 3/21/94 A3, reported in *Edupage* 3/22/94)

❑ **GLOBALNET to Link Cities** — GLOBALNET has chosen Orlando, Fla. as a prototype city in its project to link 300 metropolitan areas nationwide. The \$3-million project will connect city agencies to each other and to the Internet. (*St. Petersburg Times* 3/28/94 p. 8, reported in *Edupage* 3/29/94)

❑ **Fiber Optic to Africa** — AT&T hopes to use a \$1-1.5 billion grid of undersea fiber optic cables for communications among African countries and between Africa and the rest of the world. "African nations need to be connected to the global marketplace," says an AT&T executive. The network would be owned and managed by Africans. (*New York Times* 4/26/94 C4, reported in *Edupage* 4/19/94)

❑ **IBM's China-bound** — IBM will work with China to provide a range of information technology ventures, including designing and installing several regional communications networks as well as a backbone linking them into a national system, establishing a software development center, and opening three networking sales and service centers. (*Wall Street Journal* 5/4/94 B5, reported in *Edupage* 5/5/94)

❑ **"Access Canada"** — The Canadian federal government blueprint for a new national utility called "Access Canada" to spur development of the info-highway would create a national web of networks linking every home, business, school and government office; the blueprint focuses initially on making the government a model-user of new technologies. (*Toronto Globe & Mail* 4/25/94 B3, reported in *Edupage* 4/19/94)

❑ **Compasses for Network Navigation** — "There's an opportunity to make the Internet vastly more usable for business people. And that's

what's going on now," says the vice president of WAIS (Wide Area Information Server). Software developers are flooding the market with tools for navigating the arcane labyrinth of Internet databases, and it's only going to get better. Even Microsoft will include an Internet-made-easy communications connection in its next major upgrade of Windows. (*Investor's Business Daily* 5/6/94 A3, reported in *Edupage* 5/8/94)

❑ **Interactive TV for Kids** — A new company called DaVinci Time and Space will develop interactive TV services in which kids will be able to play games, watch videos, learn, or communicate with other kids who have similar access to interactive cable systems. (*New York Times* 3/29/94, reported in *Edupage* 3/22/94)

❑ **The Power of Positive Thinking** — Brain-activated technology maps a person's brainwaves and uses the information to control physical objects, such as moving cursors on a computer screen, steering a wheelchair, and maybe even flying an airplane. (*Discover* 5/94 p. 58, reported in *Edupage* 4/19/94)

What's Online?

❑ **Europe Online** — A group of European media, banking and publishing companies are launching Europe Online, an information service network that will offer interactive services initially in French, German and English. (*Wall Street Journal* 6/3/94 B4, reported in *Edupage* 6/5/94)

❑ **Electronic Newsstand** — To use the Internet as a way to take a look at *Educom Review*, *The New Yorker*, *The New Republic*, and many other national magazines, connect through Gopher internet.com or telnet internet.com and login as *enews*. The print version of the latest *Educom Review* is now in the mail to our subscribers (*Edupage* 2/17/94)

❑ **Electronic Filing** — More than 14 million tax returns will be filed electronically this year, according to IRS estimates. (*Wall Street Journal* 2/16/94 A1, reported in *Edupage* 2/17/94)

❑ **Reuters Targets Info Highway** — Reuters is aggressively positioning itself to be a major contributor of the information that will travel the information superhighway. Over the past year the news service has acquired all or parts of 25 companies in an effort to solidify its role in "providing the high-margin intellectual content that the electronic pipelines of the future will carry — and that traders, investors and executives will pay to receive." (*Business Week* 2/21/94 p. 46, reported in *Edupage* 2/17/94)

❑ **Groceries Online** — Winn-Dixie supermarkets in Atlanta will soon be offering online computerized ordering services through America Online for a \$9.95 delivery fee. (*Atlanta Journal-Constitution* 2/17/94 K1, reported in *Edupage* 2/17/94)

❑ **Telemedicine Expands in Georgia** — The Georgia Statewide Academic and Medicine System, a two-way interactive TV system connecting doctors with patients at remote sites, will link at least 50 health care facilities by year's end. (*Atlanta Journal-Constitution* 6/17/94 B8, reported in *Edupage* 6/19/94)

❑ **Digital Cinema** — Pacific Bell's "Cinema of the Future" will begin transmitting movies electronically to about a dozen movie theaters in Los Angeles this summer. The new process involves converting the film into digital format, zapping it along fiber-optic lines to a video server, which doctors it up for feeding into high-definition film projectors in the local theater. (*Wall Street Journal* 3/21/94 B10, reported in *Edupage* 3/22/94)

❑ **Vanderbilt Puts TV Broadcast Abstracts on the Net** — Vanderbilt University has gone ahead with a controversial plan to make abstracts

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of television news broadcasts available on the Internet. Broadcasters have worried that the university eventually may post actual footage to its archive. The Television News Archive can be accessed by pointing your Gopher at: tvnews.vanderbilt.edu. (*Chronicle of Higher Education* 6/8/94 A16, reported in *Edupage* 6/9/94)

- ❑ **Coming Soon — Newscasts on Your PC** — Intel and CNN have teamed up to test "LAN TV," a system that turns a regular broadcast TV signal into a compressed digital data stream, capable of being received on regular 486-type desktop PCs. While Intel tests the technology, CNN will concentrate on determining what it is people want to watch on their computers, in order to develop a special corporate news service. (*Investor's Business Daily* 6/20/94 A4, reported in *Edupage* 6/21/94)
- ❑ **TV Chat** — America Online and Capital Cities/ABC will offer AOL subscribers the opportunity to tap into an online newswire, a celebrity "chat," and interactive games from ABC Sports. ABC is the last of the Big Four broadcasters to wade into Cyberspace. (*Wall Street Journal* 7/7/94 B5, reported in *Edupage* 7/7/94)
- ❑ **Computer Banking Statistic** — Half of all the banking transactions at New York's Chemical Bank are now done on cash machines, the telephone or with personal computers. (*Atlanta Journal-Constitution* 5/29/94 R9, reported in *Edupage* 5/29/94)
- ❑ **Electronic Government Benefits** — The federal government will start delivering public assistance benefits electronically over the next five years, and a nationwide system will replace welfare checks and food stamps by 1999. Following a pilot program in Maryland that reduced welfare fraud by 47% in the first year, it's expected that the new system will net \$195 million a year in

savings. (*Wall Street Journal* 6.1.94 A8, reported in *Edupage* 5/29/94)

- ❑ **Click and Win a Burger** — NBC and McDonald's are planning a promotional tie-in campaign this Fall which may include electronic couponing and "click and win" consumer components on America Online. (*Advertising Age* 5/23/94, reported in *Edupage* 6/2/94)

The Legal Arena

- ❑ **Gimme Five ... And Get Your Hand Scanned for Customs** — Kiosks set up by the Immigration and Naturalization Service at JFK and Newark Airports allow you to zip through customs using an electronic hand reader to verify who you are. You can sign up to get your palm read and entered in the INS PASS system if you make at least three international flights into those airports per year. (*Business Week* 5.2.94 p. 132, reported in *Edupage* 4/28/94)
- ❑ **E-Mail Messages Released** — The University of Michigan has released copies of messages exchanged during a computer conference of the school's regents. The action was in response to requests from two newspapers, which claimed that messages passed among publicly elected officials are public information. (*Chronicle of Higher Education* 4/27/94 A26, reported in *Edupage* 4/28/94)
- ❑ **Electronic Copyright Grievance Filed** — A writer who conducted an interview with Fidel Castro in 1967 for *Playboy* has filed a grievance with the National Writers Union against the magazine, accusing it of "electronic piracy," after the interview was transferred to CD-ROM. *Playboy* had sent the author a check for \$100, which he deemed "inadequate." (*Wall Street Journal* 4/27/94 B9, reported in *Edupage* 4/28/94)
- ❑ **Online Copyright Guidelines** — A White House committee has released a report recommending a se-

ries of refinements in current copyright laws with regard to electronic transfer of information. Among the recommendations are revising "fair use" rules to include digital and online works, and making it a crime to import, manufacture or distribute devices designed to defeat anti-copying systems. (*Washington Post* 7/7/94 D9, reported in *Edupage* 7/8/94)

- ❑ **Archaeologist Wins Internet Defamation Suit** — An archaeologist, formerly at the University of Western Australia, has won a lawsuit filed in Australia against an anthropologist, claiming comments made about him on an Internet bulletin board were defamatory. Damages equal to \$28,000 were awarded after a psychiatrist testified to the plaintiff's anxiety and depression suffering caused by the remarks. (*Chronicle of Higher Education* 4/27/94 A26, reported in *Edupage* 4/28/94)
- ❑ **Ads (and Flames) on the Net** — After sending an unsolicited ad for his legal services to more than 9,000 Internet Usenet groups, a Phoenix lawyer got 30,000 replies, including thousands of "flames" [outraged messages] from persons who objected to his use of the Internet for unsolicited direct mail. Internet Direct, the lawyer's service provider, rescinded the lawyer's account. The lawyer's threatening a \$250,000 lawsuit against Internet Direct and is planning to write a book about advertising on the Internet. (*New York Times* 4/19/94 C1, reported in *Edupage* 4/19/94)
- ❑ **Hacker-Proof** — Dallas Semiconductor Corp. has developed a microchip that it says will foil even the best computer hackers trying to break into corporate files. The chip, about the size of a dime, works the same way as a hotel security card or ATM card does, and an employee could not log on without it. (*Investor's Business Daily*, reported in *Edupage* 2/17/94)

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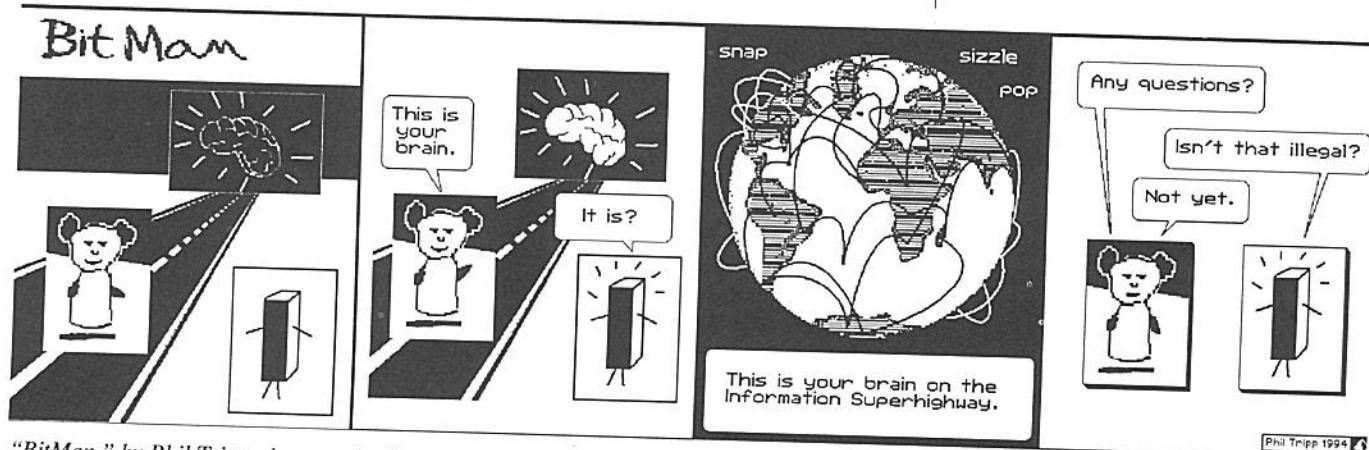
- ❑ **Privacy Warning** — Ontario's Information and Privacy Commissioner warned that the information highway needs regulation to protect user privacy. In his recommendations, the Commissioner said legislative rules must address ethical questions of monitoring E-mail by employers and urged the development of security systems to prevent third parties from intercepting communications. (*Ottawa Citizen* 2/16/94 p. D6, reported in *Edupage* 2/17/94)
- ❑ **Privacy Facing Extinction?** — Warning that Canada's "Blueprint for the Delivery of Government Services" could be the harbinger of an end to the privacy of personal information, columnist Gordon Grant contends that as government departments broaden the scope of information they share, the inability to ensure it doesn't fall into the wrong hands increases proportionately. (*Ottawa Sun* 3/28/94 p. 12, reported in *Edupage* 3/29/94)
- ❑ **E-mail Eavesdropping** — One in five companies admits that it eavesdrops on its employees by searching computer files, voice mail or E-mail, but a spate of lawsuits is beginning to curb the habit. If a company plans on monitoring employees, it should tell them in advance to avoid legal trouble later. (*Investor's Business*

Daily 4/19/94 A4, reported in *Edupage* 4/19/94)

- ❑ **Crime-Fighting on the Net** — Alert subscribers to online services geared toward collectibles — rare books, baseball cards, stamps and coins — have foiled a number of attempts to sell stolen items, and services specifically designed for fighting crime are forming. The Jeweler's Security Alliance will begin transmitting digital "wanted" posters of known jewel thieves through a privately run computer network. (*Wall Street Journal* 6/2/94 B2, reported in *Edupage* 6/2/94)
- ❑ **Cybercop** — A former New Jersey police officer now spends his time cruising for suspects in cyberspace and has been involved in dozens of criminal investigations, including a sting operation that nabbed a pedophile who lured young rape victims via a bulletin board service. (*Tampa Tribune* 6/8/94 BayLife 5, reported in *Edupage* 6/9/94)
- ❑ **Man Wanted on the Internet** — When the Okaloosa County (FL) Sheriff's Office put a "man wanted" posting on the alt.internet.services and alt.culture.internet.newsgroups, responses ranged from criticism of the posting to these particular newsgroups, to praise of the Sheriff's Office for yet another novel use of the Internet, to suggestions for creation of new newsgroups (alt.wanted,

alt.unsolved-mysteries ...). (*Edupage* 6/28/94)

- ❑ **Cyberporn is Prosecuted** — In two recent cases in Oklahoma and Texas, courts have convicted defendants for using electronic bulletin boards to distribute obscene material. In the Oklahoma case, defense attorneys argued that state obscenity laws don't apply to electronic devices such as CD-ROMs, claiming that what was on the disks was actually binary code. In the Texas case, U.S. Secret Service agents seized computers and electronic equipment from an electronic publisher. (*Wall Street Journal* 5/27/94 B3, reported in *Edupage* 5/29/94)
- ❑ **Man Charged in Electronic Stalking** — A Michigan man has been charged with breaking a state anti-stalking law for continuing to send E-mail to a woman after she and the police told him to stop. If convicted, he could be jailed for one year or fined \$1,000. (*St. Petersburg Times* 5/27/94, reported in *Edupage* 5/29/94)
- ❑ **Cruel and Unusual Punishment** — A prison inmate who uses his time to file frivolous product liability lawsuits has had his computer taken away by the judge. The Legal Aid Society says the judge's sanctions are too harsh, although the prisoner will still be able to continue to handwrite his complaints against



"BitMan," by Phil Tripp, is a regular feature of the *Buffer*, the news journal of computing at the University of Denver. This particular strip appeared in the March 1994 issue. It is reproduced here with permission from the *Buffer* and the cartoonist.

The Changing Internet

numerous companies, none of which (surprisingly?) are a computer hardware or software vendor. (*New York Times* 3/29/94, reported in *Edupage* 3/29/94)

The Work Arena

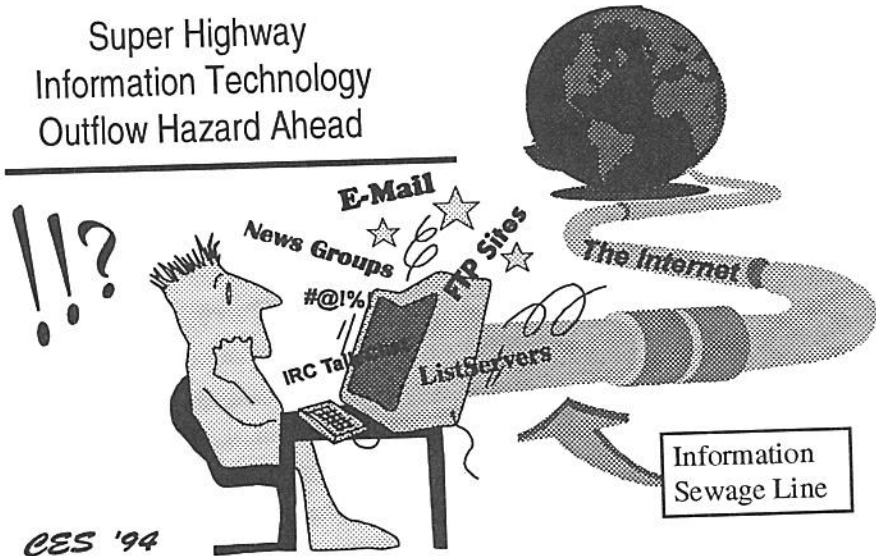
- **Brains Over Muscle** — 1991 was the first year in which companies spent more on computing and communications gear than on industrial, mining, farm and construction machines. And today, a typical new automobile has \$675 worth of steel and \$782 worth of microelectronics. (*Fortune* 4/4/94 p. 25, reported in *Edupage* 3/22/94)
- **Telecommuting** — In 1990, there were an estimated 2 million telecommuters in this country. That number has increased to 7.8 million this year. And by the year 2001, there will be an estimated 30 million telecommuters. (*NBC Nightly News* 3/22/94, reported in *Edupage* 3/22/94)
- **Software Replaces Sportswriters** — A \$100 software program called Sportswriter is capable of churning out reasonably good sports copy by intelligently stringing together words between facts. Some 80 small newspapers in the Midwest have purchased the program and are using it to cover high school sports events. (*Wall Street Journal* 3/29/94 A1, reported in *Edupage* 3/29/94)

The Downside

- **Access to What?** — In the ongoing discussions over equal access to the information superhighway, it's often overlooked that transmission is only one component of that access, the others being computer hardware and software. Government officials have yet to suggest that "Compaq offer a 'lifeline' computer for, say, \$1 a month, or that Microsoft be required to give away Word for Windows. (*Telecommuni-*



Super Highway Information Technology Outflow Hazard Ahead



cations Policy Review 4/29/94 p. 10, reported in *Edupage* 5/5/94)

- **E-Mail Bottlenecks** — Overstuffed mailboxes and oversized files are two of the biggest offenders in slowing E-mail to a snail-mail pace, according to Ferris Networks, a San Francisco-based E-mail research firm. Although the problem will be somewhat alleviated when ATM technology is fully implemented, the proliferation of more and bigger files will continue. Ferris' president anticipates an average post-compression message to be 100 kilobytes in size by 1998, up from 10K currently, with volume rising to 60 messages a day, up from 20-40 now. (*Investor's Business Daily* 4/18/94 A4, reported in *Edupage* 4/19/94)
- **Network Benefits, Network Risks** — Increasingly sophisticated networks will eventually have the whole country plugged into a single grid. Communications professor A.M. Noll at the University of Southern California warns that with the benefits of such a grid will come "a risk that some software glitch could transmit an erroneous signal or traffic indication that would collapse the entire network, bringing telecommunications to a total halt in this country." (*Forbes* 4/25/94 p. 142, reported in *Edupage* 3/29/94)
- **Tranquility Hard to Find in Electronic Age** — "I was just skiing in Vail, and they were offering cellular phones and pagers to use on the ski lift," says an astonished observer. Tranquility and solitude are getting harder to find in the electronic age, but one professor of communications is philosophical: "These devices provide an opportunity for overworking, not a mandate. Workaholics have existed forever, with or without machines." (*New York Times* 4/25/94 B4, reported in *Edupage* 4/19/94)
- **Downside to Telework** — With five Canadian government departments experimenting with telework to shift jobs away from the office using information technology, unions representing public servants warn that it may result in longer working days without additional

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compensation. (*Toronto Star* 4/25/94 E1, reported in *Edupage* 4/19/94)

- **Will Internet be Paradise Lost?** — Author James Fallows predicts that as the Internet expands, "something will have to give; either the government will stop paying, or politicians will notice that the government is paying and will impose controls, like those imposed by school boards on textbook content or by the FCC on radio and TV broadcasts. The Internet's low visibility era of subsidized innocence will end, and the network will become as complicated as anything else." (*Atlantic Monthly* July 94 p. 34, reported in *Edupage* 6/21/94)

Miscellaneous

- **NII Report Released** — A report outlining the benefits and obstacles to using the information superhighway was released last week and the Commerce Department is requesting comments on the findings. "Putting the Information Infrastructure to Work" predicts the new data highway will improve the competitiveness of the U.S. manufacturing base; speed the efficiency of electronic commerce and business-to-business communications; improve health care delivery and help contain medical costs; promote access to the educational system; and enable government to dispense services to the public faster, more responsively and more efficiently. To order copies, call (202) 783-3238 and request NIST Special Publication 857. (*BNA Daily Report for Executives* 5/5/94 A10, reported in *Edupage* 5/8/94)
- **Trolling in Public Databases** — The government routinely scours its 4,000 databases looking for welfare cheats, draft dodgers, tax cheats, etc. The Clinton Administration's proposed Health Security Card, a "smart card" with personal information on individuals, would create a

huge new government database with medical records on every citizen. (*Investor's Business Daily* 6/2/94 A1, reported in *Edupage* 6/2/94)

- **E-Mail at the White House** — Both the Bush and Clinton administrations have tried to restrict public access to White House E-mail, but later this year the National Security Agency will publish "White House E-Mail," a book-length collection of E-mail messages. The book includes Iran-Contra affair communications to and from Oliver North, who used E-mail because he thought it could be easily deleted. One message from him reads: "Oh lord. I lost the slip and broke one of the high heels. Forgive please. Will return the wig on Monday." (*New York Magazine*, 6/6/94 p. 20, reported in *Edupage* 6/5/94)
- **PC With TV, Phone, Radio, FAX** — Packard Bell will be offering personal computers that can double as radios, TVs, telephones and FAX machines. Priced at \$1,000 — \$3,000, the systems will use Intel's 486 and Pentium microprocessors and will come with stereo speakers; Most will also have CD-ROM drives and include 27 software titles. The systems will have removable plastic panels that allow a consumer to make a fashion statement by adding splashes of colors such as teal or azure. "This is like adding a tie to a suit," says a company executive. (*New York Times* 6/14/94, reported in *Edupage* 6/14/94)
- **Thoughts for All (or at Least 700) Occasions** — Computerized form letters have been written on 700 subjects to respond to mail sent to the Senate Labor and Human Resources Committee. There are "robo compassion letters" for people in declining health and a "robo poetry" letter thanking people who send in poetry. The letters are signed by an automatic pen. (*Atlanta Journal-Constitution* 3/29/94 A 14, reported in *Edupage* 3/29/94)

- **Revising Family History** — DivorceX offers to expunge all traces of your ex-spouse in the family photo albums, using a popular software called Photostop. The proprietor scans the photo, erases the unwanted party's image, and reprints the picture — all for \$100-200 a pop. What if you get back together? No problem, He'll reinsert it by the same process. (*Wall Street Journal* 6/16/94 B1, reported in *Edupage* 6/16/94)

- **Auctions in the Electronic Marketplace** — It was just a matter of time... public auctions have now become dial-up affairs, with a computer-generated voice replacing the rhythmic patter of the auctioneer. The Automated Bidding System is built around four 486 PCs and specialized software. Bidders call in on an 800 number, and the automated system doles out updated information while registering bids and tracking the process. It even calls a customer back if he overbids by mistake. (*Investor's Business Daily* 5/4/94 A4, reported in *Edupage* 5/5/94)

- **For Computer Illiterates Only** — There's now a service for executives who receive E-mail but can't deal with computers. A New Jersey-based telephone company automatically faxes E-mail messages to subscribers, allowing them to read their mail "the old-fashioned way — on paper." (*St. Petersburg Times* 5/8/94 A8, reported in *Edupage* 5/8/94)

- **Snail Mail an Endangered Species?** — Canada's postal corporation is making preparations to join the info-highway. Its chair predicts that stamped mail likely will become extinct as electronic information replaces regular mail, delivering services by TV, telephone and computer. (*Toronto Globe & Mail* 6/3/94 B3, reported in *Edupage* 6/5/94) ■

Ghost continued from page 5.

-wives found themselves leading increasingly isolated daytime lives at home.

Highways made shopping malls possible, enabling franchise and chain store sales to boom. But this sapped downtown centers.

For some teenagers and senior citizens, today's anonymous, consumption-mad expanses provide a semblance of community space — having swallowed up the general store, the soda fountain, the Main Street sidewalk, and the town square. There is ample danger of the new electronic technology extending these losses.

Remember too that it is easy to romanticize new technology. The popular arts glorified life on the highway. People read Jack Kerouac's *On the Road*, watched "Route 66" on television, and recall the Merry Pranksters' psychedelic bus-capades during the '60s. In fusing alienation and rebellion with youthful exuberance, each of these foreshadows contemporary cyberpunk culture. Yet real-life experience on the interstate is mostly banal and uneventful. McDonald's, Pizza Hut, and Wal-Mart look about the same wherever you exit.

Political Ramifications

There are also political ramifications of a vast new public infrastructure. Interstate highways contributed to national and even international economic integration. But while GNP soared, mom-and-pop production and retailing declined. That meant greater local dependence on national and global market forces and on distant corporate headquarters—powers that communities simply couldn't control. The locus of effective political intervention thus shifted toward more distant power centers. But because those are realms in which everyday citizens cannot be as

effectual as in smaller political settings, democracy was impaired.

If the growth of the highways is revealing, so too is the opposition to freeway construction that emerged. As citizens became more politically mobilized during the 1960's and early '70s, opposition to relentless highway expansion arose from environmentalists and from local communities, both rich and poor.

Transportation engineers reeled at the specter of upright citizens rejecting their good works. Many current telecommunications engineers and true-believing entrepreneurs are no less convinced of the unalloyed beneficence of their art.

The importance of the analogy between the information and asphalt highways lies in the political procedures that create them. What if a wider range of people, including non-car owners, had been involved in transportation planning all along? Considering the alternatives envisioned by critics such as Lewis Mumford, it seems likely we would have a smaller and different road system today. As in Europe and Japan, there probably would have been greater investment in public transit. Modern America might exhibit less sprawl, less dependence on foreign oil, and more cohesive urban neighborhoods.

Three Lessons

Three lessons for the construction of the information superhighway suggest themselves:

- ❶ **No Innovation Without Evaluation:** To help reduce adverse social impact, the federal government should mandate evaluated social trials of alternative electronic services. Analogous to environmental impact statements, these trials should precede full-scale deployment of any major components of new information infrastructures.
- ❷ **No Innovation Without Regulation:** We should conserve cultural

space for face-to-face social engagement, traditional forms of community life, off-screen leisure activities and time spent in nature. How about a modest tax on electronic home shopping and consumer services, rebating the revenue to support compensatory, local community-building initiatives?

- ❸ **No Innovation Without Participation:** A number of European nations are out-competing America in including lay people in technology decision-making. For instance, the Danish government appoints panels of everyday citizens to cross-examine a range of experts, deliberate among themselves and then publish their own social assessments of technological alternatives. Sweden, Norway and Germany have pioneered processes for involving workers directly in designing new production systems.

Conclusion

The coming revolution in information systems is going to change life for everyone—including the multitude who, by circumstance or choice, never use computers. It is imperative to develop mechanisms for involving all segments of our society in designing, evaluating and governing these new systems.

Data highway enthusiasts may see such measures as wasteful obstructions of market forces. But what entrepreneurs call red tape is really democracy in action. ■

Birth of The Information Age?

According to *Edupage* (6/14/94), Samuel F.B. Morse sent a message from Washington to Baltimore in 1884 asking: "What hath God wrought?" As we celebrate the 100th anniversary of this event, we're still waiting for the answer. ■

The City of Denton, TWU and UNT Creating a Civic Information System

By Mark Thacker, CWIS Coordinator (thacker@unt.edu)

Many of you probably read about the City of Denton and how it was providing access to the Internet for the Citizens of Denton in recent articles in the *Denton Record Chronicle*. While accurate in spirit, those articles were not quite accurate in fact. This article gives you an overview of what the City of Denton, TWU and UNT have planned and how it will affect you.

Background

The City of Denton, Texas Woman's University and the University of North Texas have joined together in a project to create a "civic information system." While the idea of such a project had been thought about in each organization, it wasn't until a concerned citizen, Mike Cochran, stepped forward and offered to be a catalyst for such a project that all of the parties came together. The purpose of such a project is to meld the unique talents and capabilities of each organization and produce an electronic delivery system for civic and community information. This system will provide timely information in a fashion that citizens will be able to access at their homes, businesses and community centers around Denton. *So what is this project?*

The project was initially conceived as a Gopher server utilizing existing UNT/TWU equipment. The City felt that providing information to citizens via dial-up lines to a Gopher server would be a quick and cost efficient method of disseminating information. It will serve as the initial foundation for what we envision as the "wired community." Academic Computing Services at UNT agreed to support the City of Denton by making City information available electronically on our existing Gopher server. TWU agreed that it would provide pointers to the City of Denton site from their Gopher. The City, of course, will provide the information.

Current Status

Currently, the City of Denton and UNT provide a basic Gopher accessible information system with City agencies' meeting notes and agendas. This system is designed to be expandable with additional information being added on a daily basis.

Access to electronic community information is provided two ways. The first is via a dial-up modem. Currently there is one single public dial-in line for accessing Denton information electronically. As demand increases, the City plans to add additional lines. Citizens and students do not need an account or any sort of password to access City information through this dial-in line. However, they do need a personal computer, modem and a communications program (Procomm, Kermit, etc.). The City of Denton's electronic information can also be accessed through the Internet. People already having Internet access or accounts on machines connected to the Internet, or who are at the UNT/TWU campus can access the system through any Gopher client for basically any machine (Macintosh, MS-DOS, MS-Windows, UNIX, and VAX).

Type of Information Provided

What type of information will be provided in such a system? Any items that are public record and of public interest are candidates. For example:

- City Council meeting notes and agendas
- Planning Council meeting notes and agendas

- Public utility billing rates and information
- Phone book information for City departments
- Zoning rules and regulations
- Community organization information and schedules
- Tax and land use information
- Feedback/Suggestion box capabilities for Citizens

And, as capabilities grow, additional multimedia items can be provided such as:

- Still pictures and graphics of Denton buildings sights
- Interactive maps with zooming and "hot-spot" capability
- Movie snippets and sound clips of Denton events
- Movie tours and sample images from museums and University exhibits

While this list is not exhaustive, it illustrates the potential of an "electronic village."

The Future

To expand the scope and capabilities of our electronic community information initiatives, the City of Denton, UNT, and TWU recently put in a proposal for a grant from the Telecommunications and Information Infrastructure Assistance Program. This grant will provide for additional funds for expanding this project. Included in this proposal are funds for expansion of community dial-in access, increasing the capacity of our Internet connections, additional equipment, and training.

Regardless of whether we are successful in obtaining this grant, the City, TWU, and UNT are all committed to working together to make Denton a model community for the new electronic information age. As new developments happen, expect additional articles to appear here in *Benchmarks*. If you have suggestions or questions, please contact me. ■

Hobbes' Internet Timeline v1.3

By Robert H "obbes" Zakon (hobbes@hobbes.mitre.org)

- ❑ 1956 — USSR launches Sputnik, first artificial earth satellite. In response, US forms the Advanced Research Projects Agency (ARPA) within the Department of Defense (DoD) to establish US lead in science and technology applicable to the military (:amk:)
- ❑ 1962 — Paul Baran, RAND: "On Distributed Communications Networks" — Packet-switching networks; no single outage point
- ❑ 1967 — ACM Symposium on Operating Principles — Plan presented for a packet-switching network
- ❑ 1968 — Network presentation to the Advanced Research Projects Agency (ARPA)
- ❑ 1969 — ARPANET commissioned by DOD for research into networking.
 - First node at UCLA [Network Measurements Center - Xerox DSS 7:SEX] and soon after at: [legend = function - system:os]
 - Stanford Research Institute (SRI) [NIC - SDS940/Genie]
 - UCSB [Culler-Fried Interactive Mathematics - IBM 360/75:OS/MVT]
 - U of Utah [Graphics (hidden line removal) - DEC PDP-10:Tenex]
 - Use of Information Message Processors (IMP) [Honeywell 516 mini computer with 12K of memory] developed by Bolt Beranek and Newman, Inc. (BBN)
- ❑ First Request for Comment (RFC): "Host Software" by Steve Crocker
- ❑ 1970 — ALOHAnet developed by Norman Abrahamson, U of Hawaii (:sk2:)
 - ❑ ARPANET hosts start using Network Control Protocol (NCP).
- ❑ 1971 — 15 nodes (23 hosts): UCLA, SRI, UCSB, U of Utah, BBN, MIT, RAND, SDC, Harvard, Lincoln Lab, Stanford, UIU(C), CWRU, CMU, NASA/Ames
- ❑ 1972 — International Conference on Computer Communications with demonstration of ARPANET between 40 machines organized by Bob Kahn.
 - ❑ InterNetworking Working Group (INWG) created to address need for establishing agreed upon protocols. Chairman: Vinton Cerf.
 - ❑ Ray Tomlinson of BBN invents E-mail program to send messages across a distributed network. (:amk:)
- ❑ 1973 — First international connections to the ARPANET: England and Norway
 - ❑ Bob Metcalfe's Harvard PhD Thesis outlines idea for Ethernet (:amk:)
- ❑ 1974 — Vint Cerf and Bob Kahn publish "A Protocol for Packet Network Internetworking" which specified in detail the design of a Transmission Control Program (TCP). (:amk:)
 - ❑ BBN opens Telenet, commercial version of ARPANET (:sk2:)
- ❑ 1975 — Operational management of Internet transferred to DCA (now DISA)
 - ❑ "Jargon File," by Raphael Finkel at SAIL, first released (:esr:)
- ❑ 1970s — Store and Forward Networks — Used electronic mail technology and extended it to conferencing
 - ❑ HM Elizabeth, Queen of the United Kingdom, sends out an E-mail message (anyone know the exact year?)
- ❑ 1976 — UUCP (Unix-to-Unix CoPy) developed at AT&T Bell Labs and distributed with UNIX one year later.
- ❑ 1977 — THEORYNET created at U of Wisconsin providing electronic mail to over 100 researchers in computer science (using UUCP).
- ❑ 1979 — Meeting between U of Wisconsin, DARPA, NSF, and computer scientists from many universities to establish a Computer Science Department research computer network.
 - ❑ USENET established using UUCP between Duke and UNC by Tom Truscott and Steve Belvin.
- ❑ 1981 — BITNET, the "Because Its Time Network."
 - Started as a cooperative network at the City University of New York.
 - Provides electronic mail and LISTSERV servers to distribute information.
 - Unlike USENET, where client software is needed, electronic mail is the only tool necessary.
- ❑ CSNET (Computer Science NETwork) built by UCAR and BBN through seed money granted by NSF to provide networking services (specially E-mail) to university scientists with no access to ARPANET. CSNET later becomes known as the Computer and Science Network. (:amk:)
- ❑ Minitel (Teletel) is deployed across France by French Telecom.
- ❑ 1982 — INWG establishes the Transmission Control Protocol (TCP) and Internet Protocol (IP), as the protocol suite, commonly known as TCP/IP, for ARPANET.
 - This leads to one of the first definitions of an "internet" as a connected set of networks, specifically those using TCP/IP,

and "Internet" as connected TCP/IP internets.

- DoD declares TCP/IP suite to be standard for DoD (:vgc:)
- EUnet (European UNIX Network) is created by EUUG to provide E-mail and USENET services. (:glg:)
- 1983 — Name server developed at U of Wisconsin, no longer requiring users to know the exact path to other systems.
- Cutover from NCP to TCP/IP (1 January)
- CSNET / ARPANET gateway put in place
- ARPANET split into ARPANET and MILNET; the latter became integrated with the Defense Data Network created the previous year.
- Desktop workstations come into being, many with Berkeley UNIX which includes IP networking software.
- Need switches from having a single, large time sharing computer connected to Internet per site, to connection of an entire local network.
- Berkeley releases 4.2BSD incorporating TCP/IP (:mpc:)
- EARN (European Academic and Research Network) established. Very similar to the way BITNET works.
- FidoNet developed by Tom Jennings.
- 1984 — Domain Name Server (DNS) introduced.
- # of hosts breaks 1,000
- JUNET (Japan Unix Network) established using UUCP.
- JANET (Joint Academic Network) established in the UK using the Coloured Book protocols.

Please see **Timeline** on page 20.

The Network Connection

By Dr. Philip Baczewski, Assistant Director, Academic Computing Services, and BITNET INFOREP (ac12@unt.edu).

*This column is a continuing feature of **Benchmarks** intended to present news and information on various aspects of wide area networks.*

How Secure is Your Internet Mail?

Over the past years, much news and attention has been devoted to Internet security. A couple of specific examples are the problems with hackers gaining unauthorized access to systems, as depicted in Clifford Stoll's *The Cuckoo's Egg*¹, and the very much publicized Internet worm incident that temporarily shut down many Internet-connected computers in 1988.² A bigger issue of Internet security exists on a smaller scale. If you don't know already, Internet mail is not, by default, secure. It is not necessarily insecure, but since it is transmitted in clear text and may pass through two or more machines before being delivered, the chance does exist that it could be inadvertently or intentionally copied or intercepted along the way.

There are several existing and upcoming solutions to making Internet E-mail more secure. A new Internet standard called Privacy Enhanced Mail (PEM) proposes a structure for transmitting and authenticating secure E-mail. An existing public-domain program named PGP (Pretty Good Privacy) written by Philip Zimmerman implements a solution similar to that specified in the PEM standard. Both implement the Rivest-Shamir-Adleman (RSA) public key system of cryptography. By applying an advanced level of cryptography to mail and files sent over the Internet, it is possible to ensure a reasonable degree of security.

Complex Issues

The issues surrounding RSA security are diverse and sometimes complex. However, the technical issues are not as confusing sometimes as the political ones. The U.S. Federal government has imposed export restrictions on certain types of encryption technologies. RSA security is included in these restrictions, and when a copy of PGP was posted on an anonymous FTP server that was openly accessible by those outside of the U.S. and Canada, certain agencies of the U.S. government were quick to begin pointing fingers, ultimately resulting in some difficulties for Philip Zimmerman. Today, the distribution of PGP is somewhat controlled and restricted to use in the U.S. by U.S. citizens or residents. In spite of these complications, however, PGP remains a quite useful program.

If you are familiar with computer programs that perform encryption, you know that when you want to make information secure, you usually do so by providing a key word or phrase which is used as the basis for calculating the encrypted information values. To reverse the process and decode the information, you have to provide the same key as was used for the encryption. As long as you are the only person who knows the key, then your information will be reasonably secure; however, once you

¹Stoll, Clifford, *The Cuckoo's Egg*, Doubleday, New York, 1989.

²Hafner, Katie and John Markoff, *Cyberpunks, Outlaws and Hackers on the Computer Frontier*, Simon and Schuster, New York, 1991.

wish to transmit information to someone else in a secure fashion, a single-key encryption method becomes problematic. Finding a secure way to transmit that key can be difficult or impossible, especially if you want to do so automatically and electronically. RSA security uses a concept called dual key encryption. It is implemented with both a public key and a private key, terms which you are likely to hear more and more often as this scheme is integrated into messaging applications. The RSA algorithm uses a scheme in which information encoded with one key can only be decoded with the other. In other words, if a file is encrypted using the public key then it can only be decoded using the corresponding private key. The reverse is also true. In practical terms, public/private key encryption lets you digitally sign a document using your private key (in your possession only), and encrypt a document intended for someone else using their public key (acquired directly from that person or from an authenticated representative). Other people can send you information encrypted using your public key that only you can decode using your private key.

PGP

PGP is one program that implements RSA security for the purposes of encoding electronic mail. PGP is not the only program available, but an intriguing aspect of it is that the author has placed it in the public domain. If previous programs are any indication (Kermit, for example), PGP could become a de facto standard for Internet mail security. Both PGP and the PEM standard do not actually use the RSA algorithm to encrypt an entire message. Instead, they employ a standard single-key encryption method (Data Encryption Standard or DES) with a randomly generated key, and then encrypt that single key using RSA. This method provides the authentication and security features

of RSA, but with the speed of a single-key algorithm.

PGP performs a number of functions in support of E-mail security management. It will allow you to generate a key pair: a private key for signing your mail, and a public key which you can distribute to others as their verification of your signature. It will maintain a "key ring" where you can store your and other's public keys. Most importantly, it will encrypt and sign files and allow you to generate them in two formats: a binary file for local access (i.e. encrypted for local security purposes only or for transfer by binary FTP), or an ascii-encoded version that can be sent across the Internet via E-mail.

PGP is available in versions for MS-DOS, Macintosh, and UNIX. It can be

obtained via Anonymous FTP from net-dist.mit.edu, in the directory, /pub/PGP (the Massachusetts Institute of Technology serves as the official distribution point for PGP). You must first acquire the README file in that directory which will provide you instructions on the procedure for acquiring PGP from that site. Because of the restrictions on the distribution of PGP, you will actually need to telnet to the MIT machine and verify your status within the U.S. and agree to abide by the export and licensing restrictions. Because you want your security program to be secure from tampering, it's best to get it from the most reputable source possible. The distribution process at MIT provides some controls on distribution, but more importantly to you, also assures you of a reputable source.

List of the Month

Each month we will highlight one BITNET, Internet, or USENET Special Interest Group (SIG) mailing list. This month's list...

GRANTS-L on LISTSERV@GSUVM1.GSU.EDU

Grants and Funding for International Education and Research

Owner: James F. Pettus ibcjfp@gsusgi2.gsu.edu

GRANTS-L is an initiative of the Regents' Global Center of the University System of Georgia, and serves to promote external funding for international education and research. The [LISTSERV](mailto:LISTSERV@GSUVM1.GSU.EDU) is intended to provide a forum for sharing experience, ideas, thoughts, comments and sources of information on the preparation and administration of contracts and grants.

Specific topics include, but are not limited to: proposal writing and editing; federal/state laws and regulations; campus policies and procedures; animal care and use; misconduct in science; procurement integrity; consulting; cost sharing; publication rights; budget development; direct and indirect costs; grant/contract administration; client relations; Internet resources; electronic editing and software; and so on.

To subscribe, send the following command in the BODY of mail to LISTSERV@GSUVM1.GSU.EDU:

sub grants-l YourFirstName YourLastName ■

Further Information

More information about RSA security in general and about the PGP program can be found in the PGP documentation, which provides some excellent background material on some of the cryptography issues as well as some history of the PGP program. The file names are PGPD0C1.TXT and PGPD0C2.TXT and are distributed with the program. Another way to learn about PGP, RSA security, and the PEM standard is to read the USENET news groups alt.security.pgp, alt.security.ripem, info.pem-dev, and sci.crypt.

It's likely that the next generation of E-mail programs will include security as a feature. A proposal to integrate PEM or PGP within the MIME standard is also in the works. With the increasing expansion of the Internet, and the advent of more commercial communication via electronic means, the ability to authenticate electronic communication becomes more and more important. Awareness of these issues now will make it easier to take full advantage of the Internet in the coming years. ■

FAQs Available Via E-Mail

Three FAQs produced by Kevin Savetz (savetz@rahul.net) are now available via electronic mail. Just put any of the following boldface commands in the subject line of your message to receive an FAQ on the desired topic.

- **send is-faq** — to receive the Internet Services FAQ.
- **send booklist** — to receive the Unofficial Internet Book List.
- **send fax-faq** — to receive the Faxing from the Internet FAQ.
- **subscribe is-faq or booklist or fax-faq** — to receive periodic updates to the info. of your choice. ■

New Internet Book Available

By Cynthia Koepp, *Benchmarks* Assistant Editor (koepp@cc1.unt.edu)

Now available for checkout at the ISB library: *Directory of Directories on the Internet: A Guide to Information Sources* by Gregory B. Newby, published by Meckler. The author describes it as:

a book to help you to identify some of the "guideposts" on the Internet and the relations among different resources. It is aimed at all Internet users, old and new. For newer networkers, this book offers an overview of what's out there, and a way to focus in on some of the discussion forums and information services most likely to meet their needs. For a more experienced networker, this book is a reference tool for finding those resources that the user can remember seeing somewhere, but can't remember where (1).

If you have ever rooted around your work area for a particular scrap and scribble ("Where is that info about the Rick Gates' Internet Hunt?"), you probably can relate to Newby's last comment!

This book discusses such diverse Internet topics as Gopher, WorldWideWeb (WWW) and Netiquette, but it's a much slimmer volume than *The Whole Internet* (which Newby mentions in the chapter covering books about the Internet). There is also a chapter covering books on the Internet. *Directory of Directories on the Internet* gives you a lot less detail about FTP, for example, and less of an idea of the exact operating system commands you may need to learn.

Okay, so maybe you still will have to contend with scraps and scribbles — although it's amazing how few commands you really have to learn in order to successfully use FTP, for example, and using a program like Gopher (which can access FTP sites) could make your work even easier.

A really nice feature of *Directory of Directories on the Internet* is the inclusion of information such as:

- ☐ An idea of an item's revision status (when/how often/ever)
- ☐ Copyright restrictions
- ☐ Who might find this resource useful
- ☐ Whether you need to be using a particular operating system (e.g. UNIX)
- ☐ A sample entry. If something from the sample catches your eye, it's likely you'd find more good stuff from that source.

This book really is an excellent place to start. For example, if you are feeling information overloaded and you just want to know where it is on the Internet that you can find the directory containing all past Internet Hunt Questions and Answers, it's in here. The book is indexed by: Resource Type; Internet Address; Author, Maintainer, or Supplier; and Subject. ■

The Changing Internet

Timeline continued from page 20.

- ❑ 1986 — NSFNET created (backbone speed of 56Kbps)
 - NSF establishes 5 super-computing centers to provide high-computing power for all (JVNC@Princeton, PSC@Pittsburgh, SDSC@UCSD, NCSA@UIUC, Theory Center@Cornell).
 - ARPANET bureaucracy keeps it from being used to interconnect centers and NSFNET comes into being with the aid of NASA and DOE.
 - This allows an explosion of connections, especially from universities.
- ❑ Cleveland Freenet (start of NPTN) comes on-line (:sk2:)
- ❑ Network News Transfer Protocol (NNTP) designed to enhance USENET News performance over TCP/IP.
- ❑ Mail Exchanger (MX) records developed by Craig Partridge allowing non-IP network hosts to have domain addresses.
- ❑ 1987 — NSF signs a cooperative agreement to manage the NSFNET backbone with Merit Network, Inc. (IBM and MCI involvement was through an agreement with Merit). Merit, IBM, and MCI later founded ANS.
 - ❑ UUNET is founded with Usenix funds to provide commercial UUCP and USENET access.
 - ❑ 1000th RFC: "Request For Comments reference guide"
 - ❑ # of hosts breaks 10,000
 - ❑ # of BITNET hosts breaks 1,000
- ❑ 1988 — Internet worm burrows through the Net
- ❑ 1989 — # of hosts breaks 100,000
 - ❑ NSFNET backbone upgraded to T1 (1.544Mbps)

- ❑ RIPE (Reseaux IP Europeens) formed (by European service providers) to ensure the necessary administrative and technical coordination to allow the operation of the pan-European IP Network. (:glg:)
- ❑ First relay between a commercial electronic mail carrier (CompuServe) and the Internet through Ohio State University (:jg1:)
- ❑ 1990 — ARPANET ceases to exist
 - ❑ Second relay between a commercial electronic mail carrier (MCI Mail) and the Internet through the Corporation for the National Research Initiative (CNRI)
 - ❑ Electronic Frontier Foundation is founded by Mitch Kapor
- ❑ 1991 — Commercial Internet eXchange (CIX) Association, Inc. formed by General Atomics (CERFnet), Performance Systems International, Inc. (PSInet), and UUNET Technologies, Inc. (AlterNet) (:glg:)
 - ❑ WAIS released by Thinking Machines Corporation
 - ❑ Gopher released by University of Minnesota
 - ❑ US High Performance Computing Act (Gore I) establishes the National Research and Education Network (NREN)
- ❑ 1992 — Internet Society is chartered
 - ❑ World Wide Web released by CERN
 - ❑ # of hosts breaks 1,000,000
 - ❑ NSFNET backbone upgraded to T3 (44.736Mbps)
 - ❑ First MBONE audio multicast (March) and video multicast (November)
- ❑ 1993 — InterNIC created by NSF to provide specific Internet services: (:scl:)
 - directory and database services (AT&T)

- registration services (Network Solutions Inc.)
- information services (General Atomics/CERFnet)
- ❑ US White House comes on-line:
 - ✕ President Bill Clinton: president@whitehouse.gov
 - ✕ Vice-President Al Gore: vice-president@whitehouse.gov
 - ✕ First Lady Hillary Clinton: root@whitehouse.gov (-:rhz:-)
- ❑ Internet Talk Radio begins broadcasting (:sk2:)
- ❑ United Nations and World Bank come on-line (:vgc:)
- ❑ US National Information Infrastructure Act
- ❑ Businesses and media really take notice of the Internet
- ❑ Mosaic takes the Internet by storm; WWW proliferates at a 341,634% annual growth rate of service traffic. Gopher's growth is 997%.
- ❑ 1994 — Communities begin to be wired up directly to the Internet
 - ❑ US Senate and House provide information servers
 - ❑ First flower shop taking orders via the Internet
 - ❑ Shopping malls arrive on the Internet
 - ❑ Mass marketing finds its way to the Internet with mass E-mailings
 - ❑ Worms of a new kind find their way around the Net - WWW Worms (W4), joined by Spiders, Wanderers, Crawlers, and Snakes ...
 - ❑ "A Day in the Life of the Internet" begs to be published (:rhz:)

The Changing Internet

Internet growth summary:

Date	Hosts		Date	Hosts	Networks	Domains
1969	4	+	07/89	130,000	650	3,900
04/71	23		10/89	159,000	837	
06/74	62		10/90	313,000	2,063	9,300
03/77	111		01/91	376,000	2,338	
08/81	213		07/91	535,000	3,086	16,000
05/82	235		10/91	617,000	3,556	18,000
08/83	562		01/92	727,000	4,525	
10/84	1,024		04/92	890,000	5,291	20,000
10/85	1,961		07/92	992,000	6,569	16,300
02/86	2,308		10/92	1,136,000	7,505	18,100
11/86	5,089		01/93	1,313,000	8,258	21,000
12/87	28,174		04/93	1,486,000	9,722	22,000
07/88	33,000		07/93	1,776,000	13,767	26,000
10/88	56,000		10/93	2,056,000	16,533	28,000
01/89	80,000		01/94	2,217,000	20,539	30,000

Countries

Date	I	B	U	F	O
09/91	31	47	79	49	
12/91	33	46	78	53	
02/92	38	46	92	63	
04/92	40	47	90	66	25
08/92	49	46	89	67	26

(I)Internet (B)ITNET (U)UCP (F)IDONET (O)SI

Countries

Date	I	B	U	F	O
01/93	50	50	101	72	31
04/93	56	51	107	79	31
08/93	59	51	117	84	31
02/94	62	51	125	88	31

USENET growth summary:

Date	Sites	-MB	-Posts	Groups		Date	Sites	-MB	-Posts	Groups
1979	3		2	3		1984	900		225	
1980	15		10			1985	1300	1.0	375	
1981	150	0.5	20			1986	2200	2.0	946	241
1982	400		35			1987	5200	2.1	957	259
1983	600		120			1988	7800	4.4	1933	381

~ approximate: MB - megabytes per day, Posts - articles per day.
HELP: Where is this data archived from 1989- ?

About the Timeline

Comments/corrections should be sent to hobbes@hobbes.mitre.org. Hobbes' Internet Timeline Copyright (c)1993-4 by Robert H Zakon. Permission is granted for use of this document in whole or in part for non commercial purposes as long as appropriate credit is given to the author/ maintainer. For commercial uses, please contact the author first.

Hobbes' Internet Timeline was compiled from a number of sources, with some of the stand-outs being:

- Cerf, Vinton (as told to Bernard Aboba). "How the Internet Came to Be." This article appears in "The Online User's Encyclopedia," by Bernard Aboba. Addison-Wesley, 1993.
- Hardy, Henry. "The History of the Net." Master's Thesis, School of Communications, Grand Valley State University. <ftp://umcc.umich.edu/pub/users/seraphim/doc/nethist#.txt>
- Hauben, Ronda and Michael. "The Netizens and the Wonderful World of the Net."

- Kulikowski, Stan II. "A Timeline of Network History."
- Quarterman, John. "The Matrix: Computer Networks and Conferencing Systems Worldwide." Bedford, MA: Digital Press. 1990

Internet growth summary compiled from:

- Zone program reports maintained by Mark Lottor at: <ftp://ftp.nw.com/pub/zone>
- Connectivity table maintained by Larry Landweber at: ftp://ftp.cs.wisc.edu/connectivity_table

USENET growth summary compiled from Quarterman and Hauben sources above

Contributors to Hobbes' Internet Timeline have their initials next to the contributed items in the form (:zzz:) and are:

- amk - Alex McKenzie (mckenzie@bbs.com)
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- jg1 - Jim Gaynor (gaynor@agvax.ohio.state.edu)
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- sc1 - Susan Calcari (susanc@is.internic.net)
- sk2 - Stan Kulikowski (stankuli@uwf.bitnet) - see sources section
- vgc - Vinton Cerf (vcercf@isoc.org) - see sources section

Help the Author

The author is on an eternal genealogical search. If you know of someone whose last name is Zakon or could spare 1 minute to check your local phone book, please e-mail any info (i.e., name, phone, address, city) to rhz@po.cwru.edu; your help is greatly appreciated. ■



News From the CWIS/Gopher Hole

By Mark Thacker, CWIS Coordinator (thacker@unt.edu)

This column covers features and resources available through the University's Gopher Campus Wide Information System (CWIS). Gopher is available on various UNT host computers including the VAX, Sol, and Jove. It is also available in the General Access Labs and on various Novell file servers around campus.

Gopher Clients

When people mention Gopher they normally think of the particular Gopher client they are used to. For most people, this is either PC Gopher or UNIX/VAX Gopher. There are, however, several more Gopher clients that are in use here at UNT. For the most part, the Gopher clients are very similar, but there are some differences that you need to be aware of and this article is designed to help you decide which Gopher client to use.

Each client is highlighted below and includes a brief table describing the hardware and software needed to run the system.

PC Gopher III

Hardware	• XT or greater
	• mono or color video
	• Ethernet card
	• 640K RAM
Software	• Packet drivers or ODI with ODIPKT
Special Features	• Runs on low-end machines with monochrome monitors
	• Same interface as Trumpet News reader for DOS – Windows-like
	• Supports mouse operations
	• Can call Telnet/TN3270 with automated connect scripts
	• Supports Gopher+ alternate views
	• Multiple simultaneous download/transaction capability
Problems or Bugs	• Phone book program with point-and-click field selection
	• Can not auto-launch viewers for images, sounds, etc.
	• Does not use EMS or XMS memory – runs out of conventional memory very soon causing crashing and errors

Problems or Bugs Continued

- Has limited Gopher+ electronic form length
- Default values for electronic form is different from all other clients
- Doesn't run under Windows well at all
- Unsupported from the University of Minnesota now
- Slow network response and tricky setup
- No real on-line help despite the label for such
- No direct connection to other Gopher server option - must navigate menus to get to anything.
- Can not print file while within PC Gopher – must do so with other program

When first considering this article, I thought about calling it "The Death of PC Gopher III". However, better judgement prevailed. The problems with PC Gopher and the move of our campus off DOS-only and into Windows and OS/2 for Intel based machines makes me believe that it is time to wean people from using PC Gopher. If you can use HGopher, the Gopher client for Windows, please, please, PLEASE do. Or switch over to using TurboGopher for the Macintosh!

HGopher for Windows

Hardware	• 80386SX or greater (requirements of the Trumpet TCP/IP stack)
	• Ethernet card
	• Windows requirements for RAM and monitor (color)
Software	• Trumpet TCP/IP stack
	• Packet drivers or ODI with ODIPKT

General Information

Special Features	• Gopher+ complete support of Alternate Views, electronic forms etc.
	• Excellent display of electronic forms of any length
	• Support for hundreds of definitions of viewers for files
	• Winsock compliant for compatibility with other Windows Internet tools
	• On-screen icons for all actions
	• Multiple bookmark files
	• Direct connect to remote sites using the Bookmarks capability
	• Autolaunches viewers after file download
	• Multiple simultaneous download/transaction capability
	• Quick response and query speed
	• Ability to set preferences as to which view to retrieve when multiple views of an item are available
	• Automatic filename creation and download to a directory capability
	• Deletes temporary files at program close
	• Extensive on-line help with examples and icons
	• Change display font of menus
Problems or Bugs	• Creation of bookmarks to open other Gopher connections is a bit confusing
	• All transactions and new menus displayed in one window only
	• Phone book lookup requires user to type query

HGopher is probably one of the best Gopher clients there is. If at all possible for you to use either this or TurboGopher for the Macintosh, please do. The Trumpet TCP/IP stack is a site license product for UNT and allows all sorts of Internet tools to work in Windows simultaneously.

TurboGopher for the Macintosh

Hardware	• Macintosh Plus or greater
	• Ethernet card, SCSI adapter or built-in Ethernet
Software	• MacTCP
Special Features	• Gopher+ complete support of Alternate Views, electronic forms etc.
	• Excellent display of electronic forms of any length
	• MacTCP compliant for compatibility with other Macintosh Internet tools
	• Multiple bookmark files
	• Direct connect to remote sites
	• Launches viewers after file download with single click
	• Multiple simultaneous download/transaction capability
	• Quick response and query speed
	• Balloon Help
	• Japanese language character display with special system software
	• Multiple window or single window display of menus
	• Excellent phone book lookup procedure with point-and-click fields and logical separators ("contains," "begins with" and "equals")
	• Can print or save items

Problems or Bugs	• limited set of viewer definitions
	• Alternate views must be chosen via a menu item, not an icon

TurboGopher is probably the second best Gopher client around, but is still the fastest and most reliable Gopher client for the Macintosh. A Power-Macintosh version of it should be out soon.

UNIX/VAX Gopher

Hardware	• Modem if communicating over UNT dial-up lines
	• Ethernet card if communicating on-campus
Software	• Any terminal program that emulates a VT-100 terminal
	• Telnet if communicating on-campus
	• Packet Drivers or ODI with ODIPKT if using Telnet
Special Features	• Unlimited viewer definition
	• Runs on any machine capable of using Telnet or a modem
	• Alternate views and electronic forms support
	• Autolaunches viewers when file is downloaded
	• Direct connect to remote Gopher sites
	• Good phone book query support with simple fill-in-the-field approach
	• "Gripe" capability to send mail back to an item's maintainer
	• Can download, mail, print or save files
	• Can be accessed from anywhere on the Internet or from your house

General Information

Special Features Continued	• On-line help
	• On-screen context sensitive display of options
Problems or Bugs	• One bookmark file supported only
	• All transactions within one window (limited to VT-100 screen)
	• No multiple-transactions occurring simultaneously

The Gopher client for UNIX and VAX is actually a pretty good client. It is the only one really available if you want access to Gopher from your home. There is an anonymous Gopher login that you can use if you do not have an account on any host machine, yet still want to access it remotely.

CMS Gopher

Hardware	• Modem if communicating over UNT dial-up lines • Ethernet card if communicating on-campus
Software	• Any program that emulates a VT-100 • Telnet or TN3270 if communicating on-campus • Packet Drivers or ODI with ODIPKT if using Telnet or TN3270
Special Features	• Accessible from any machine capable of using Telnet/TN3270 or a modem • Direct connect to remote Gopher sites • Good phone book query support with simple fill-in-the-field approach • Can print or save files • Can be accessed from anywhere on the Internet or from your house
Problems or Bugs	• One bookmark file supported only • All transactions within one window (limited to VT-100/3270 screen) • No multiple-transactions occurring simultaneously • Not Gopher+ capable – no electronic forms or alternate views

The CMS Gopher client is not all that much different from the UNIX/VAX Gopher client and should only really be used if you have access to CMS only. Remember to type **TCPIP** before typing **GOPHER** when running it. It is not, to my knowledge, Gopher+ compatible, which limits its usefulness somewhat because there is no support for electronic forms and the like.

I hope that this has helped to clear up any questions you had about which Gopher client to use. If you want to learn more about Gopher or about using the clients mentioned above, drop by ISB 119 and talk to me, register for a short course on using Gopher or send me E-mail. ■

Some Welcome Changes Come to the Local Dial-up Lines

We have installed some new terminal server equipment that will greatly increase the reliability and functionality of the 3989 local dialup line. All communication settings are the same for the 565-3989 line (8-N-1), no matter which system you connect to. The 565-3300 line still requires you to set your communication program to 7-S-1 when connecting to CMS (VM3270).

Now, when you call 565-3989 you will be greeted with a menu instead of the old # prompt. From the menu, select the desired host system. If the host system isn't in the menu, simply type: **telnet host.system.name.here** to connect to the system of your choice (substituting the correct node information for that system, of course).

The inside front page of this issue of *Benchmarks* has the phone numbers and terminal settings to use for all the fully supported UNT Dial-up lines. ■

WP User's Group 1994 Summer Schedule

The WordPerfect User's Group is open to any interested student, faculty, or staff member who wishes to share information or address questions about WordPerfect products supported by the Computing Center.

The WP User's Group will resume meetings in the fall. The dates and times will be announced in *Benchmarks*, on WPO Mail and in the Personnel Newsletter. ■

General Information



Information Resources Council News

Minutes provided by Sue Harrison, Recording Secretary

IRC Regular Voting Members: Ray von Dran, Library and Information Sciences (Chair); Cengiz Capan, College of Business; Carolyn Cunningham, Student Affairs; Paul Dworak, College of Music; Brian Forsman, TCOM Information Resources Council; Chuck Fuller, Fiscal Affairs; Larry Gleeson, School of Visual Arts; Don Grose, Libraries; David Hartman, School of Community Services and School of Merchandising and Hospitality Management; Monica Holmes, Graduate Student Council; Sam Magill, TCOM Director of Information Technology Services; Steve Miller, Administrative Affairs; Tom Newell, Telecommunications (Ex-officio); Don Palermo, Academic Administration; Jean Schaake, College of Arts and Sciences; Paul Schlieve, College of Education; John Todd, Faculty Senate; Virginia Wheelless, Associate Vice President and Director, University Planning and Institutional Research; Steve Williams, Undergraduate Student Association. **IRC Ex-officio Nonvoting Members:** Bill Buntain, Computing Center; Jim Curry, Microcomputer Maintenance Shop; Paul Gandel, Computing Center; Richard Harris, Computing Center; Coy Hoggard, Computing Center.

May 17, 1994

IRC Program Groups

Richard Harris distributed a diagram which showed how the IRC Program Groups interact with Providers and Users in the Planning Process, as well as a current list of Program Group Members, and the initial charges as they were given to the groups. Harris explained that at the last Strategic Planning Committee meeting the primary activity was to answer the question: "What do the Program Groups do now?" The Goals, Objectives, and Strategies have been submitted to the UPC, and all of the major University-wide strategies will be carried forward into the University plan. This does not mean that all of the strategies will be funded, however; they will fall back to the budgetary process to be funded. The program groups will continue to be very active in assisting with planning, funding, monitoring, and evaluating projects to implement information technology strategies.

Distance Learning

Ray von Dran reported that the Provost has asked that the issue of distance learning be addressed by the IRC. There is also a Dean's committee looking into this, but they will be concerned mostly with their own departmental long-range plans and how distance learning will fit into those plans. Von Dran plans to bring representatives from the Computing Center, the Library, Telecommunications and the Instructional Technology Committee together with the Dean's committee to work on this issue, after which von Dran will work with Jack Davis, taking into consideration the input from all of these groups. In addition, some time in the summer there will be a campus-wide forum to discuss distance learning. He stressed the importance of moving quickly on this and on working to clarify the definition of distance learning. Von Dran explained that after all input has been gathered, the IRC will need to come forward with a recommendation based on a proposal from the Deans.

Lab Fee Increase Requested

Cengiz Capan distributed a letter he wrote to David Kesterson regarding a request for a fee increase. Capan reported that statistics from the Check-in system reports show an overall increase in lab usage of 1 to 2% every year, even though student enrollment is declining at the rate of 3% per year. Philip Baczewski added that the statistics show that usage has spread out more evenly over all the labs. Paul Dworak commented that the labs have only been in existence a few years and to change them now would not be a good idea. Capan continued that it will discourage students from using the labs if current technology is not available in them. GAL has given money back to the colleges to update equipment as they needed to rather than wait and do a general upgrade of all the labs at one time. Capan stressed that if General Access Labs are going to be operated right, to serve students' needs and the University's needs, it is necessary to have these additional funds.

The Chair asked the Council if it wants to support the initial request GAL made last year for a fee increase of \$.75/credit hour (\$.25 of which was put into effect last year). Discussion continued during which it was pointed out that whereas the Adaptive Lab used to be supported by the Provost's contingency funds, it is now a line item in the GAL budget. In addition, most of the current lab equipment was purchased from Prop II funds and it will definitely need to be upgraded in order to provide the services needed. If there is no fee increase, GAL will have to request Prop II funds for equipment upgrades.

Capan brought to the floor the GAL Committee's recommendation to re-submit the original recommendation to increase the lab fee the remaining \$.50 for the upcoming academic year, and it was approved unanimously.

General Information

GUI Migration

Bill Buntain made a presentation for the Standards & Cooperation Program Group on the migration to Graphical User Interfaces. The Program Group proposes the following, to occur in FY96, to address computer hardware issues:

- ❶ that a fixed amount of money be budgeted on a periodic basis;
- ❷ that allocations be based on Faculty/Qualified Staff Distribution (Staff defined as Administrative, Professional, Technical, and Clerical);
- ❸ that the migration apply to a choice of platforms;
- ❹ that suballocations be made at the Vice President/Dean level;
- ❺ that the migration be administered through the Microcomputer Maintenance Shop; and
- ❻ that progress be reported through the Standards & Cooperation Program Group to the IRC.

Buntain explained that the issue of excluded personnel, as well as what kind of machine should be included are two issues that the Program Group has not come to agreement on. At the present time, they believe that notebook computers should not be included.

Other Business

Buntain continued with an action plan for campus-wide acquisition of software to begin in September of 1994. The Standards & Cooperation Program Group proposes that an allocation of \$250,000 be made per year for the licensing of products from WordPerfect, Microsoft, Lotus and Borland with funds being placed in a separate account administered by the Computing Center.

Ray von Dran suggested that he take these proposals before the Deans; that they be considered at the next Strategic

Planning Committee meeting, and then be brought back to the IRC at its June meeting. It was agreed that the proposals be dealt with as two separate proposals, since one is proposed for FY95 and the other for FY96.

Philip Baczewski distributed two documents, one dealing with a movement towards an enterprise-wide User-ID system, for information purposes. The second document dealt with issues relating to the upgrade or replacement of the Academic Mainframe. It was recommended that this subject be given to the Instruction and Research Program Groups asking that those groups provide input to Philip so that he can make a presentation to the IRC at its June meeting.

June 14, 1994

Program Group Reports

The Chair called for reports from each of the IRC Program Groups, specifically related to their activity and suggested changes they might wish to make in the groups at this time.

For the Administrative Program Group, Joneel Harris reported that Philip Baczewski had spoken to the group about proposals for Academic Computing, since one of them impacts the administrative mainframe. The group also discussed the remote access policy. She announced that on July 8, 1994, from 2:00-4:00, in Union 411, IBM will present upgrade options for the existing IBM ES9000 mainframe computer, as well as various client/server options.

For the Standards and Cooperation Program Group, Susan Pierce reported that they are continuing to meet on the 2nd and 4th Mondays of every month. The group has been dealing with security at the last two meetings.

For the Instruction Program Group, Paul Gandel reported that the group had met with the Instructional Technology Committee to look at an Academic mainframe upgrade, at which a number of questions were raised. The ITC took

the assignment to conduct a needs assessment, and the groups plan to meet again in July with an eye towards making a recommendation to the IRC in September.

Centralized Purchasing of Software

Susan Pierce presented the recommendation of the Standards & Cooperation Program Group for centralized purchasing of software site licenses so that individual departments can stop ordering it by the package. The proposal would require \$250,000 per year in centralized funding.

In the discussion that followed, questions were raised regarding funding, and administration of the centralized purchasing arrangement. It was pointed out that one advantage would be better tracking of software, which would reduce the problem of unlicensed software. It was explained that the funding issues will have to be dealt with by the Vice Presidents, and that the IRC is only being asked to recommend the concept. Several other advantages of such a plan were pointed out; for example: the cost of single copies of software are extremely low for departments when purchased through the proposed licensing program; also, with low cost software upgrades available to everyone, departments can keep up-to-date copies of software running, making software support much more manageable, since only the latest versions of software would need to be supported.

The proposal, as brought to the IRC by Susan Pierce, Convener of the Standards & Cooperation Program Group, with the addition of a friendly amendment made by John Windsor, is as follows: "The IRC proposes the allocation of monies for centralized purchasing and licensing of software products for University computing, for example, WordPerfect, Microsoft, Lotus and Borland software." The proposal, as amended, was unanimously approved.

Virginia Wheelless suggested that the responsibility for coordination and im-

General Information

plementation of the plan be given to the Computing Center. Richard Harris accepted the responsibility, and the Chair said that if the concept is approved by the Vice Presidents, he would take it to Richard to work out the details.

User-IDs and E-Mail

Philip Baczewski reported that he is continuing to revise the specifications document for the Enterprise-wide User I.D. system based on input from various persons. The next step will be to develop an action plan.

Paul Schlieve, as Chair of the E-Mail Task Force, reported having met individually with several people to finalize a recommendation that he and Bill Buntain will be presenting to the E-Mail Task Force. Paul stressed that the E-Mail Task Force will not mandate what software gets run or how it gets supported. Departments will determine what happens at the departmental level and the Computing Center will determine what gets done at the back end. He hopes to bring the final recommendation to the IRC soon.

Computer Security Issues

Susan Pierce distributed a document concerning Computer Security Issues, which details a new Texas Administrative Code on Information Security Standards for all state agencies. Complete implementation of this code is mandatory by the end of 1997. She reported that UNT has a head start because the IRC has already prepared a security policy. Susan discussed the new law with the Standards & Cooperation Program Group and from their discussion came the following issues which must be addressed:

- 1 UNT policies should be reviewed and revised to parallel the state standards. It is recommended that the IRC charge the Standards & Cooperation Program Group to draft a revision of the policy for review by the IRC;

- 2 An Information Security Function must be established to administer the IRSP. It is recommended that the IRC affirm the appointment of Susan Pierce, Computing Center;

- 3 Security Awareness Training must be implemented for all users. Unless the work is distributed between departments (such as Computing Center, Personnel, network managers, and others), this will require significant new staff resources. It is recommended that the IRC charge the Computing Center with the development of a curriculum and a project plan for training. Once approved by the IRC, the IRC Chair will present the plan to the Information Resources Steering Committee and seek commitment for necessary support, including staff support;

- 4 Non-disclosure agreements should be signed by all users, with a special non-disclosure agreement to be signed by each system administrator. It is recommended that the IRC charge the Standards & Cooperation Group with the development of (1) non-disclosure agreements for users and for system administrators, and (2) a plan to implement this process.

- 5 A "login banner" should appear at the time (ideally BEFORE) a user logs in to any UNT multiuser computer system, which reads:

In accordance with state security standards: Unauthorized use is prohibited. Usage may be subject to security testing and monitoring. Abuse is subject to criminal prosecution.

It is recommended that the IRC endorse a login banner as a standard for all UNT multiuser computer systems;

- 6 The law states that 'Management reviews of physical security measures shall be conducted annually...' It is recommended that Internal Audit be responsible for conducting these reviews;
- 7 A periodic, comprehensive risk analysis of all information process-

ing systems is required. It is recommended that the Computing Center investigate the possibility of initially outsourcing this task.

The Chair said that the Strategic Planning Committee will look at all of these issues and bring them before the IRC at the July meeting.

General Access Lab Access Problems

Paul Gandel reported that there have been a fair amount of complaints from persons who have been denied access to General Access Labs. In the discussion that followed, it was pointed out that Ph.D and Master's Degree students and students working on Incompletes are approved to use General Access Labs through the summer months. It was noted that a large part of the problem is students not enrolled in the summer but who plan to attend in the fall. Eriq Neale stated that the General Access Labs try to accommodate these students. Eriq distributed a document concerning these issues which explained the current policies of the General Access Labs. Virginia Wheelless recommended that the General Access Lab Committee be asked to follow the Recreational Sports model for summer participation by nonenrolled students, which is to require a small fee for use of programs and facilities. The motion was seconded and passed unanimously. ■

IRC Meeting Schedule

The IRC generally meets on the third Tuesday of each month, from 2-4 p.m., in the Administration Building Board Room. All meetings of the IRC, its program groups, and other committees, are open to all faculty, staff, and students. ■

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